

## Sept. Sales Display Strength

### Estimated 160,000 Units Likely on Present Basis

by Athel F. Denham

Detroit Editor, Automotive Industries

Domestic retail deliveries of passenger cars in the first half of September were 15 to 20 per cent under the same period in August. However, if sales in the second half of the month are as good as in the first half, passenger car sales in September will total 160,000. Trucks during the first two weeks of the month sustained a somewhat larger loss than did passenger cars.

Despite these seasonal declines in sales, retail demand is well in excess of production schedules, which underwent further moderate decreases in the week ending Sept. 22 with several plants shut down.

With the industry definitely in the clean-up period, considerable attention undoubtedly will be focused during the next few weeks on the used car situation. Largely due to the code, dealers began to show a gross profit on used cars early this year. Such profits reached a peak in April, but have been declining ever since until in August the trade again showed a used car gross loss. At the present time used car stocks are at a point where material reductions are essential if expensive liquidation later in the year is to be avoided.

Dodge reports domestic sales of passenger cars in the week ending Sept. 15 of 3443 Plymouth and Dodge passenger cars and 867 trucks. In the same week Dodge dealers sold 4243 used cars and 731 used trucks. Total 1934 domestic sales to date include 72,539 cars, 34,315 trucks and 78,441 Plymouths for a total of 185,295 as compared with roughly 130,000 units in the same period last year.

Hudson reports eight-month factory shipments of 72,715 cars, an increase of 109 per cent over last year, and 77 per cent ahead of the total in all of 1933. August shipments were said to have been 15 per cent in excess of July with domestic retail sales in August 40 per cent larger than factory shipments, resulting

in a substantial reduction in dealer stocks.

Buick reports a sharp upturn in retail sales throughout the country for the first 10 days of September. A total of 1700 new cars were delivered during that period compared with 1388 in the last 10 days of August, and 1249 in the first 10 days of Sept., 1933.



W. S. Knudsen, GM vice-president who sailed from New York Tuesday night on a business tour of inspection of General Motors manufacturing and assembly plants in Europe.

### NSPA Members Report Increased Volumes Of 35% to 64% for First Half Over '33

Increased business volumes ranging from 35 per cent to 64 per cent for the first half of this year over the corresponding period of 1933 are reported to the N.S.P.A. by member manufacturers, that organization reports. According to the N.S.P.A. parts manufacturers show an average increase of 35 per cent, while tools and equipment makers report a corresponding figure of 64 per cent.

This data was collected by means of

a "survey" distributed by the organization to all members, and is so tabulated as to indicate business as "good," "fair," "poor," according to the 11 territories into which the N.S.P.A. divides the country. This present survey is the second to be released during this year, according to R. W. Procter, secretary, and will be continued on a quarterly basis.

For the second quarter of the current year parts manufacturers report a 25 per cent increase in volume over the same three months of last year; tools and equipment manufacturers report a 54 per cent gain for the second quarter over the same period of the previous year. The survey also shows that of jobbers being sold by the reporting N.S.P.A. parts making members, 3 per cent are on a C.O.D. basis; 23 per cent past due; 62 per cent are discounting their bills. Corresponding figures for the tools and equipment makers are 1½ per cent, C.O.D.; 25 per cent past due, and 71 per cent, discounting.

#### In This Issue

Tests of the Merits of Butane in Engine Fuels on page 348

Effects of Grooves and Fillets on the Endurance of Heat Treated Steel on page 352

Energy Distribution in Engines on page 354

A German Development in Balanced Indicators on page 356

## Steel Union Drive For Recognition Seen

### AFL Organization Making Capital of Houde Ruling To Force Plant Elections

Hailing as a sweeping victory the majority representation ruling by the National Labor Relations Board in the case of the Houde Engineering Corp., organized labor through the Amalgamated Association of Iron, Steel and Tin Workers is pressing hard for union recognition in the iron and steel industry. Already victorious at elections at the plants of the West Virginia Rail Co. and the Apollo Steel Co., supervised by the National Steel Labor Relations Board, the association is actively trying to consolidate its forces for pending drives on the largest units in the industry, the United States Steel Corp., the Republic Steel Corp., and the Bethlehem Steel Co. In the South the first move by the association since the Houde decision has been made at the plant of the Gulf States Steel Co. in Birmingham, Ala. Last Friday hearings were held in connection with claims that workers at the plant had been discharged for union activities. More important from their point of view, members of the association charged denial of the right of collective bargaining.

In the first week of October, a hearing will be held at Pittsburgh before the National Steel Labor Relations Board on the petition of amalgamated workers at the McDonald, Ohio, plant of the Carnegie Steel Co., where last June an election gave a strong victory to the company union. The pending petition seeks a new election to determine collective bargaining representation, the association seeking to upset the prior election on the ground that the company union does not represent the workers within the meaning of Section 7-a of the Recovery Act. Especial importance is being given this petition by the association inasmuch as it turns upon activity at the largest subsidiary of the largest steel unit in the industry. Reports have it that the union has been unusually busy in organizing and that it believes it would register a victory if another election were held. In this connection the decisions of both the National Labor Relations Board and the National Steel Labor Relations Board are undoubtedly depended upon by organized labor to stimulate anew its campaign to muster additional members, and it may be expected that the formidable drive already under way to gain control of labor in the iron and steel industry will be pushed to the limit. Recognition is, of course, the end sought,

though dealing with organized labor and recognizing it as such obviously are different matters.

Discrimination and denial of collective bargaining rights are alleged in a complaint by the association against the Republic Steel Corp., at its Warren, Ohio, plant, charges that were denied by the company both at conferences with the National Steel Labor Relations Board and in its brief. Amalgamated members in seeking to make most of these cases meanwhile have announced that the Bethlehem Steel Co. has agreed to deal with one of its committees at its Sparrows Point, Md., plant.

### Rayfield to Aid Firth At Marvel Carbureter

W. C. Rayfield, carbureter engineer, has been added to the engineering staff of Marvel Carbureter Company, division of Borg-Warner Corporation.

Mr. Rayfield has long been associated



W. C. Rayfield

with automotive engineering and was one of the designers of the Rayfield carbureter. He will assist David Firth, Marvel engineering chief, in developing Marvel carbureters for the automobile manufacturers.

### Texas Suit Attacks NRA Constitutionality

The constitutionality of the National Recovery Act is attacked in a suit filed in the Federal district court here by the Boggus Motor Company of Harlingen, Tex. The case is given a political tinge by reason of the fact that R. B. Creager, Republican National Committeeman for Texas, has tendered his service as attorney to the plaintiff company without charge. The petition seeks an injunction against the NRA automobile code and alleges breach of contract by the Government.

## NRA'S OK to Dealer Code Revision Sought

### Modified "Liquidated Damages" Section Asked To Aid Code Treasury

The National Control Committee of the Motor Vehicle Retailing Trade has submitted for NRA approval a proposed modification of the industry's approved code.

The modification consists of a new section on "Liquidated Damages," which would permit industry members to enter into an agreement whereby those found guilty of code violations would be required to pay various amounts to the code authority treasurer. Amounts collected would be distributed to employees directly affected. Code administration expenses would be defrayed in the case of labor provision violations with funds received for violations of other than labor provisions; the balance, if any, would be distributed semi-annually among members who are parties to the agreement and who are not code violators.

Deputy Administrator J. G. Roberts has announced that any objections relative to the suggested code modification must be in his office, room 4321, Department of Commerce Building, prior to Oct. 2, 1934.

### Chrysler to Call Dodge Bros. Debentures Nov. 1

On Nov. 1, the Chrysler Corp. will call for redemption \$10,000,000 of 6 per cent gold debentures of Dodge Bros., Inc., at \$105 and accrued interest, Board Chairman Walter P. Chrysler announced this week. The debentures were assumed by the corporation when it bought the Dodge properties in 1928 and they are not due until May 1, 1940.

In view of Chrysler's strong cash position, it has been decided to make this substantial reduction in funded debt to decrease fixed charges. The result will be to improve net earnings by about \$500,000 annually. After the retirement proposed, the corporation's funded debt will be reduced to \$30,016,500, which is but little more than half the debt assumed when Dodge was purchased.

### Truck Code Assessments Made Mandatory by NRA

An amendment to the trucking code has been approved by NRA making mandatory the payment of code assessments. Members of the National Code Authority for the industry gives state compliance officers the necessary authority to proceed against non-registrants.



The Fords, Henry and Edsel, Discuss Detroit Tigers' Pennant Race With Manager Mickey Cochrane

## Henry Crane Met. Section Speaker at First Meeting

Henry M. Crane, technical assistant to the president of the General Motors Corp., and former president of the S.A.E., will address the opening meeting of the Metropolitan Section to be held in New York on Monday evening, Oct. 8. Mr. Crane's subject will be, "Recent Trends in Passenger Car Design." The meeting will be held at the Roger Smith, 40 East 41st Street, at 7:45 p. m., with Joseph A. Anglada, who has arranged the meeting, in the chair.

In past years, regular monthly meetings of the Metropolitan Section have been held on the third Thursday. This year the date of meetings has been advanced and they will occur on the second Monday, except in November, when a three-day meeting devoted to Maintenance and Transportation, will be staged in Newark, N. J., on the 8th, 9th and 10th of the month.

## NRA Approves Hot Water Heater Code Authority

The NRA has announced approval of the following members of the code authority for the automobile hot water heater industry: C. C. Bradford, Eaton Products, Inc., Cleveland; J. E. Goerlich, Goerlich, Inc., Toledo, Ohio; F. M. White, Liberty Foundries Co., Rockford, Ill.; G. W. Thompson, Noblitt-Sparks Industries, Inc., Columbus, Ohio. and H. C. McNeil Illinois Iron & Bolt Co., Carpentersville, Ill.

## NLRB Gets No Answer From GM Subsidiary

WASHINGTON, Sept. 19—Guide Lamp, General Motors subsidiary, apparently has decided to ignore the order issued against it on September 5 by the National Labor Relations Board. In sub-

stance this order paralleled the famous Houde ruling and gave Guide until Sept. 15 to notify the board that it would comply with its provisions. Since that date has come and gone without any word from Guide, it is interpreted here as meaning that Guide directly and General Motors indirectly are lining up with Houde on the fundamental principle involved.

Although Guide has issued no statement as to its position, it is reported that the Guide Employees Association has informed the NLRB that its members will not be governed by the ruling.

## Houde Rebuffs Johnson; To Abide By APEM Code Authority Findings

Taking the position that the APEM code authority from which it received its Code Eagle still finds that it is complying with the applicable provisions of the code, the Houde Corporation this week refused to surrender its Eagle as demanded by General Johnson.

The grounds on which the corporation refused to give up its Eagle indicate that it has the support of the APEM code authority in its stand for proportional representation, although no statement on the subject could be obtained from APEM. However, a check up of leading parts manufacturers indicates that the advice of the National Association of Manufacturers to disregard the National Labor Relations Board ruling for majority representation, will be generally followed. Since the APEM code authority is responsible to NRA and to President Roosevelt, members of the code hold that they are justified in preferring to abide by the rulings favoring proportionate representation as made by the President, General Johnson and Donald Richberg.

The next moves apparently are up to

## Ford World Output Doubles Over 1933

First 8 Mos. Production Increased 97.5%; Gains in Foreign Countries 68%

Figures on Ford world production show that the company's output of cars, trucks and commercial vehicles for the first eight months of 1934 was practically twice that of the same period last year.

The figures are: total world production for the first eight months of 1934, 696,070 vehicles; for the first eight months of 1933, 352,405 vehicles—an increase of 343,665 or 97.5 per cent.

Production in every foreign country where Ford has plants so far this year has shown very substantial increases over that for the same period a year ago. In some countries production trebled. The increase in production for all countries outside the United States was 68 per cent.

## Studebaker Promotes Pretz

Christian Pretz, who has been connected with the Studebaker Corporation since 1914, has been appointed head of the purchasing, engineering and manufacturing divisions of the Studebaker truck division, Studebaker executives have announced.

Washington. Neither NLRB nor NRA has indicated what they will do. However, it is expected that the former will press for a court test of its majority representation ruling while the latter also may go into court on the Eagle issue.

The present controversy brings to the forefront once more the question of the Automobile Labor Board's jurisdiction over the parts and equipment industry. Since the settlement which created the ALB provides for proportional representation, the A. F. of L. as a matter of policy refuses to recognize that it has any jurisdiction over the parts plants. On the other hand, employers refuse to go before regional labor boards under the NLRB. Manufacturers contend that employer representatives on regional boards are frequently unable to be present and, as a result, the regional boards are often "stacked" in favor of labor.

## Frederick B. Judkins

Frederick B. Judkins, for 43 years treasurer of the J. B. Judkins Co., died early last week at his home in Merrimac, Mass.



## PAA Votes for Dealer Profit Survey; Factory Code Aid Main Convention Note

Factory cooperation in enforcing compliance with the motor vehicle retail trade code was the dominant note at the annual convention of the Pennsylvania Automotive Association held in Philadelphia this week. Although the meeting was a gathering of dealers, it was of more than passing interest to manufacturers since it is one of the largest of its kind held anywhere and consequently offered an unusual opportunity to plumb dealer sentiment.

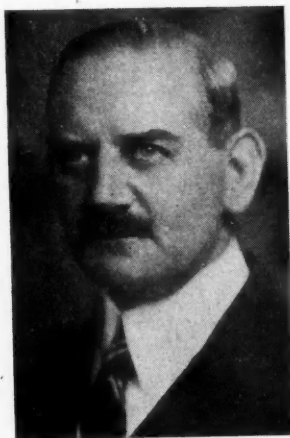
Reductions in gross profit per new unit which, it was asserted, arose largely from changed policies on freight and accessories inaugurated at the beginning of the year by some factories, caused the dealers to launch probably the most comprehensive fact-finding survey ever undertaken by a dealer organization. There was a widespread conviction among the dealers that such reductions had gone far to offset the improvement in their used car position under the code. To get the facts, a comparative survey will be made by the association of gross and net profits in the first eight months of 1933 and 1934. The survey is to be directed by Edward Payton who will consolidate the returns into one report for all dealers participating, and also into separate consolidations on each make. What the association will do with the facts developed, obviously depends on what the facts show.

The dealers left no doubts of their enthusiasm for their code and its continuance, nor did there appear to be any question that the majority of them felt that the factories should cooperate in its enforcement. J. Reed Lane, executive secretary of the dealer code authority, expressed the popular viewpoint well when he said that the position taken by F. W. A. Vesper in his recent letter to the manufacturers (*Automotive Industries*, Sept. 1) that the manufacturers can no longer take a negative position, was sustained. He emphasized that there is no in between place—that the factories must state whether they are for or against the code which has the approval of dealers, consumers and labor.

F. W. A. Vesper, chairman of the National Control Committee, appeared optimistic about securing factory cooperation. He regards the code as the salvation of the business, and expressed the opinion that the factories realize it and that they are not going to muffle the opportunity to stabilize automobile retailing.

Alfred Reeves, NACC vice-president, who was one of the speakers, said in this

connection that he did not think any one would say that the dealers' code has not been a most helpful thing. Continuing, Mr. Reeves said, "While resolutions have been passed by various dealer associations, asking for the manufacturers' assistance in policing and enforcement, I find considerable doubt on the part of our members as to their legal rights in



Alfred Reeves

that direction. . . . I gather opinions that any combination of car manufacturers and dealers to maintain price control would be considered highly objectionable by the consumers and might eventually bring about government control such as is found in other industries where price fixing is allowed. Then, too, any attempt of manufacturers to impose their will on dealers in a way that might drive them out of business for alleged violation of a provision of a code . . . would doubtless bring law suits for damages. . . . If the manufacturers combined among themselves under an agreement not to sign a dealer whose franchise was cancelled for code violation, then such manufacturers might be subjected to a suit for conspiracy by the cancelled dealer and by the Department of Justice."

Parenthetically, it may be said that independent inquiries among the factories in Detroit bear out the picture of factory attitude on dealer code enforcement presented by Mr. Reeves. *Automotive Industries* could uncover no evidence that any factory planned to project itself into the situation and practically no desire to do so. Moreover, it was felt that, if legal and practical obstacles could be brushed aside, any program aimed at strengthening dealer compliance, would have to be backed unanimously by all the manufacturers. This obviously intro-

duces difficulties since the NACC cannot speak for Ford.

It remained for Edward Payton, specialist in dealer management and sales problems, to bring out one point to which little attention has been paid in trade discussions of factory code cooperation. "A code 100 per cent effective would no doubt insure an adequate profit to motor car retailing. . . . If the code becomes 100 per cent effective, and showed itself to be a permanent part of motor car retailing, then I predict that retailing at all major points will be done by the factories." In other words, effective code enforcement would practically guarantee retail profits, in which case, Mr. Payton concluded, the factories naturally would take these profits for themselves.

## W-O Petition for More Cars Now Before Court

Attorneys for David R. Wilson, Willys-Overland receiver, have filed a petition with the Federal Court at Toledo, O., for permission to make from 5,000 to 15,000 passenger cars and trucks. The court's order to the receiver to show cause why the petition should be granted is returnable Oct. 1 and the hearing on the petition has been set for later the same day.

According to Mr. Wilson production on this lot will probably begin about Nov. 15 if the court grants the petition. He had announced that financing and sale of the cars and trucks are assured.

Recent conferences which have been held by creditors and bond holder groups in New York is believed to have developed a much better feeling among all interests.

## J. K. Focke Joins Universal

J. Kenneth Focke, formerly of Fond du Lac, Wis., has become associated with the Universal Motor Co., Oshkosh, Wis.

Formerly Mr. Focke was assistant treasurer of the Joyce Cirdland Co., assistant sales manager of the Ohio Rake Works, and associated with the sales division of United Motors Service. In his new position he will be located in Universal's electric power and lighting division.

## Lane Expected to Move Office to St. Louis

J. Reed Lane, executive secretary of the Motor Vehicle Retail Code Authority, is expected to move his headquarters to St. Louis as a result of a recent decision of the National Control Committee. Heretofore Mr. Lane has had his office in Washington. The Washington office of the Motor Vehicle Retail Trade Code Authority, however, will be continued.



## Small Depositors May Get 100% From Detroit Bank

A plan to pay off in full all depositors of the First National Bank of Detroit with less than \$300 balance when the bank closed has been advanced by a depositors' committee headed by William J. McAneaney, Hudson president. The plan proposes that all depositors with more than \$300 balance at the time of closing waive 50 per cent of a 20 per cent dividend to be paid out of an \$83,000,000 loan by the RFC.

It is reported the plan has the approval of the Roosevelt administration and the Comptroller of Currency, J. T. F. O'Connor. Depositors of the bank already have received a dividend of 50 per cent of their balance through a previous RFC loan made to the closed institution.

## MEMA Adds 11 New Members to Roster

Eleven more manufacturers have become affiliated with the Motor and Equipment Manufacturers Association since Aug. 15 to bring the total additions to the MEMA roster up to 54 since the first of the current year.

Following are the 11 newest additions: American Grease Stick Co., Muskegon, Mich.; Clover Mfg. Co., Norwalk, Conn.; C. V. S. Mfg. Co., Flint, Mich.; Dole Valve Co., Chicago, Ill.; General Automotive Specialty Co., New York, N. Y.; Mansfield Tire & Rubber Co., Mansfield, Ohio; Morrison Bros. Co., Dubuque, Iowa; Townsend Co., New Brighton, Pa.; Service Mfg. Co., Erie, Pa.; Wagner Electric Co., St. Louis, Mo., and Watson Rubber Stem Tube Co., Inc., Indianapolis, Ind.

## Quarter of Patent Suits Automotive in Character

Nearly 25 per cent of the patent suits filed in Federal courts this year have involved devices of an automotive character, George C. Arvedson, manager of the Patents Department of the National Automobile Chamber of Commerce, reports.

Of 522 patents filed during the first eight months of this year, 117 of them concerned devices for use in the automobile industry, Mr. Arvedson disclosed.

## Hudson Ruggedness Run To Be Staged This Month

A ruggedness run embracing a tough 1500-mile circuit through Michigan, Ohio and Indiana will be started before the end of this month by the Hudson Motor Car Company. A Hudson-Terraplane which will be selected at random from among owners of 1934 models will

be driven continuously over the route night and day for a period of two weeks.

Three shifts of drivers will be employed. These men will be of average type and not professional or race drivers. Performance demonstrations are included in the program along the route. It is estimated that the car will complete the circuit every two to three days.

## Novo Engine Co. Officers and Directors Re-elected

At the recent annual stockholders' meeting of the Novo Engine Company, R. H. Scott was re-elected president and Clarence E. Bement, one of the founders of the company, was re-named chairman of the board. There were no changes in the directorate and other directors are Harry C. Teel, Eric P. Teel, Robert C. Rueschaw and John Bohnet.

Beside the officers names Eric P. Teel was re-elected vice-president and general manager, and Lee Haybarker, secretary-treasurer.

## Automotive Employment Down, Pay Up for Aug.

August employment in automotive factories declined six per cent from July, but last month's payrolls showed an increase of 8.2 per cent over the previous month, Secretary of Labor Perkins states in her report for August.

Miss Perkins' report indicates there was a general increase of one per cent in all factory employment and a three per cent wage advance for August over July.

## Mich.'s Automotive Payrolls Up in Aug.

**Weekly Aggregate Passed  
\$5,000,000 for Month;  
30% Gain in Employees**

Aggregate weekly payrolls for 107 automotive companies in Michigan reporting to the department of Labor and Industry at Lansing passed the \$5,000,000 mark for the month of August, with a total of \$5,300,966 as compared with \$4,903,175 in July and \$4,455,412 in August of last year.

The number of employees in these plants, while showing a 30 per cent increase over last August, dropped from July of this year, with a total of 228,176 for August as compared with 240,599 in July and 173,917 in August of last year.

The combined picture shows an increase in weekly earnings of 10 per cent over July but a drop of 11.6 per cent compared with August of last year. The average weekly earnings figures are \$22.70 for August of this year, \$20.38 for July, and \$25.62 for last August. In all three cases, average weekly earnings exceeded the average for all industry within the state, and for the month of August was surpassed only by Chemical and allied products, and the paper and printing industries.

Total industrial employment in Michigan during August showed a slight decline from July, but payroll totals continued their steady climb, due primarily to the automotive industry.

## Highway Monster



The daily transportation of 2700 men 14 miles from the headquarters at Boulder City, Nevada, to the dam site in Black Canyon was one of the many problems successfully solved by the construction engineers. The capacity of this highway monster is 150 men or 25 times as many passengers as can be carried by the Twin Ignition Nash Big Six shown beside it

## Reeves Praises Johnson as Courageous Critic of Textile Union In N. Y. Speech

General Johnson's outspoken and courageous criticism of union leadership in the textile industry won the plaudits of Alfred Reeves, NACC vice-president, during the latter's address before the convention of the Pennsylvania Automobile Association in Philadelphia this week. Mr. Reeves referred to the speech the NRA chief made last week in New York in which he described an agreement made between NRA and the textile unions last June and charged that "the present strike is an absolute violation of that understanding."

Mr. Reeves continued his praise of the General by saying that whatever form the reorganized NRA takes he hopes General Johnson will occupy a position of importance.

In his New York speech the NRA administrator said the textile code was the first under NRA and that exhaustive study had been given the problems of the industry before it was decided to fix the 40 hour work rule. He said:

"Tom McMahon sat in on the arbitration and agreed with that result. Of all the codes, the textile code was subject to the most exhaustive analysis, and became a precedent

for all others.

"But the moment the hearing opened and without any notice to me of a change of heart he appeared on the platform in our first great goldfish bowl proceedings and repudiated the agreement that he made with me in the preliminary discussion.

"It was my first experience with organized labor in the textile industry and it was not encouraging. Last June a strike was threatened in the textile industry.

"We reached an agreement on that controversy and on that agreement the strike was called off. The present strike is an absolute violation of that understanding. And I must say here with all the solemnity which has characterized such an announcement, that if such agreements of organized labor are worth no more than this one, then that institution is not such a responsible instrumentality as can make contracts on which the country can rely."

It was in this speech that General Johnson also recommended the establishment of industrial unions as opposed to craft unions. Discussing this phase of the labor situation he said he had proposed to the Industrial Advisory Board that they recommend industrial organization of labor, not company unions but organizations which would embrace all employees of each distinct industrial division.



T. O. M. Sopwith, skipper of the Endeavour, who will be guest of honor at Metropolitan Section luncheon at Hotel Commodore

### Rapp & Hollins Handling Chain Belt Foundry Line

The Chain Belt Company announces the appointment of Rapp & Hollins, Inc., foundry equipment sales and engineering, as the exclusive agent in northern Indiana, northern Illinois, eastern Iowa and Southern Wisconsin for Rex Sand Handling Equipment, Rex Mold Conveyors, Rex Casting Conveyors, and other Rex foundry equipment. Rapp & Hollins, Inc., are located at 7001 North Clark Street, Chicago.

### Stout Addresses Engineers

William B. Stout, vice-president of the Stout Engineering Laboratories, Inc., Detroit, was guest speaker at the opening fall meeting of the Engineers' Society of Milwaukee on September 19. He spoke on "New Styles in Transportation."

### NRA Reported Studying Liquidated Damage Plan

A plan whereby dealer code administrative agencies could assess liquidated damages against code violators is reported under consideration by NRA. The plan, which is similar in principle to a provision in the steel code, would apply

only to dealers who had assented to it. In other words, damages could be levied only against dealers who had previously agreed that in the event they violated the code, they would pay damages. Having assented, if code violator fails to pay damages levied on him, it is held that they could be collected by civil suit.

### Carboloy Moves Plant to Larger Quarters

Carboloy Company, Inc., has moved its general offices, Detroit district office, and main manufacturing plant to larger quarters at 2985 East Jefferson Avenue, Detroit, where they will occupy two floors of a modern manufacturing building. The new quarters, containing increased floor space of approximately 86 per cent over the former quarters, have been equipped for a large, immediate increase in plant capacity on Carboloy standard and special tools and dies and contain reserve space for future expansion as required.

### Packard Expands Plans

Packard is expanding its Canadian production plans to provide increased facilities for its projected smaller car. The plans include leasing additional factory space in Windsor.

### Sopwith, Met. Section Luncheon Honor Guest

T. O. M. Sopwith, designer, builder and skipper of "Endeavour," will be the guest of honor at a luncheon to be given him by the Metropolitan Section of the Society of Automotive Engineers, in New York, at 1 p. m., Sept. 28.

The luncheon will be held in the west ballroom of the Hotel Commodore. Members of the American Power Boat Association, Society of Naval Architects and Marine Engineers, etc., have been invited to attend. Tickets may be obtained from S.A.E. headquarters in New York.

### Wisconsin Registrations

Wisconsin new car registrations in August numbered 4802, compared with 5015 in July and 3702 in August, 1933. Total registrations for the first eight months of 1934 were 31,095, against 19,988 in the same period of 1933. August motor truck registrations were 947, compared with 696 a year ago, and registrations for the first eight months were 6407 against 3490 in the like period of 1933.

## NACC Seeks Detroit As Steel Base Point

**Chamber Directors Ask Motor Capital Be Named Under Code by the I.S.I.**

By action of its directors, the National Automobile Chamber of Commerce has recorded with the Iron and Steel Institute its desire that under the steel code the City of Detroit shall be named as a basing point.

Efforts to get from the Institute an indication of when it might act on the Chamber's request were futile. In fact, it was impossible to obtain an admission that such a request had been received officially from the N.A.C.C. The Institute's position apparently is that the reduction in delivery charges permitted under Commercial Resolution No. A21, effective July 19, takes care of the situation adequately and that further action is unnecessary.

The matter of making Detroit a basing point for steel, however, is complicated. Not only is there a division within the steel industry over the question, but there also is a division among consumers in the Michigan area. Those outside the Detroit district share with steel producers also outside that district the opposition to making Detroit a basing point. Protesting consumers contend it would give undue advantage to Detroit users of steel; on the other hand, the latter, together with steel makers in the Detroit area, consider that Detroit, which, during the depression has been the largest single center of steel consumption, is entitled to recognition as a basing point.

The car makers feel, however, that making Detroit a basing point would provide a more stable situation since they hold that the present arrangement is subject to further adjustment at any time by the steel industry. It is felt in some quarters also that such adjustments might be used to meet threatened establishment of more steel plants in automotive centers.

Whatever may be done, it is believed that the efforts made repeatedly to establish Detroit as a basing point will have to come to a head in the relatively near future. In the latest revision of the Steel Code Detroit was turned down. With other sections of Michigan, however, Detroit is given preferential freight rates on steel shipments.

## Ex-Cell-O Moves Huntley

O. J. Huntley, precision boring demonstrator for Ex-Cell-O Aircraft & Tool Corp. for several years, has been transferred to that organization's sales staff and will be located in Dayton.

## NACC Awaits Official Approval of New Name

Actual operations of the National Automobile Chamber of Commerce under its new designation of Automobile Manufacturers Association, are awaiting formal approval of the Secretary of State of New York, contingent upon the fact that the new name must appear in the charter of the organization. Inquiry on Sept. 19 found the date of the change not yet established.

## Brother & Associates Get Olds Adv. Account

The new advertising agency which will handle the Olds Motor Works account after Nov. 1 is D. P. Brother & Associates. Appointment of a new agency for Olds was announced originally in the Sept. 8 issue of *Automotive Industries*.

The Olds account has been handled by the Campbell-Ewald organization. D. P. Brother, the principal in the new agency, has been a Campbell-Ewald vice-president, and his associates are chiefly from the older organization. Offices of this new company will be in the General Motors Building, Detroit.

## James Q. Goudie

James Q. Goudie, a director of Briggs Mfg. Co. and of Michigan Steel Tube Products Co., died early Sept. 19 at his home in Bloomfield Hills, near Detroit. At one time, Mr. Goudie was general sales manager of Pennsylvania Rubber Co.

## Report Edenburn Dangerously Ill

DETROIT—W. D. Edenburn, manager of the Michigan Automotive Trade Association, and widely known in automobile and motor boat racing circles, is dangerously ill here of uremic poisoning.

## Competition Keynote Of NSPA Convention

**Engine Reconditioning Demonstration Feature of This Year's Program**

The question of meeting increasing competition from car factories, chain stores and mail order houses, as well as the subject of retail parts and service sales by automotive wholesalers, will be given special attention at both general and divisional sessions of the N.S.P.A. annual two-day convention scheduled for the Hollenden Hotel, Cleveland, Nov. 16-17.

The program committee, in charge of arrangements for the meeting, have included on the official schedule an opening general session on Friday morning, Nov. 16, to be followed by divisional meetings for jobbers and manufacturers in the afternoon. General sessions, both morning and afternoon, will close the convention Saturday, Nov. 17.

A new feature on the program will be an engine reconditioning demonstration on Sunday, Nov. 18. According to H. N. Nigg, wholesalers' secretary, this demonstration will present in actual operation all of the equipment required to do a complete engine reconditioning job. This demonstration is designed to show jobbers how they can meet the rebuilt engine service now offered by Ford and which may be provided by other car makers in the near future.

Tuesday, Nov. 20, during show week, N.S.P.A. will sponsor a conference of secretaries of local and regional groups of automotive wholesalers. On Tuesday evening the association will hold its annual salesmen's convention session.

## Expect Cost Formula OK

Final approval of the truck code cost formula is expected in the near future. Differences of opinion between the national code authority for the industry and NRA were settled at a recent meeting of the two groups.

## Ford V-8 Powers Champion Boat



Photo shows Harold Wilson driving "Little Miss Canada, III" powered with a Ford V-8 engine to win first world championship in the new 225 cu. in. international power boat class at the Canadian National Exhibition. Three of the leading point winners in the meet were driven by Ford V-8 engines



## Would Give Federal District Attorneys Special Aides to Work on Dealer Cases

Permission to provide each Federal district attorney with a lawyer assistant who would specialize in enforcement cases under the motor vehicle retail trade code has been requested of NRA, according to J. Reed Lane, executive secretary of the code authority of that trade.

By providing such assistants, Mr. Lane believes, more expeditious handling of complaints would be obtained. Such an assistant could become more intimately familiar not only with the intricacies of the dealer code but also with the ramifications of the retail automobile business than is possible either for the district attorney or his regular assistants. The district attorney, of course, would not be relieved of any of his legal duties, but much of the detail work of developing and handling cases could be done for him by the special assistant. It is Mr. Lane's idea that the code authority would pay the assistant for his services, except for a dollar a year which he would receive from the government.

Mr. Lane stated that there already had been 61 favorable actions, including injunctions and indictments, against violators of the motor vehicle retail code. Moreover, action will be sought on about 80 more cases within the next two weeks. Two-thirds of the charges of chiseling, Mr. Lane reported, are against dealers representing two manufacturers.

Apparently recognizing the threat that the current reorganization of NRA may hold to the marketing rules of the dealer code, Mr. Lane emphasized the need for convincing the public the code does not fix prices, but maintains those set by the manufacturer. He also stressed that the used car provisions have not been objected to by the public and that dealers must support them by sending in accurate used car sales reports so that the guide books will be above suspicion.

On Friday of last week NRA announced that permanent injunctions restraining three Maryland dealers from violation of the code had been obtained. According to NRA, the organizations enjoined were Phoebus Bros. Chevrolet Sales Co., Anderson Motor Co. and the Park Circle Motor Co. The last of the three, NRA states, was enjoined specifically from violating that section of the code which covers sales of new vehicles in an enfranchised territory to an unauthorized dealer for resale purposes. NRA also announced last week that the Federal grand jury in Chicago had returned indictments against the Clark

Maple Chevrolet Co., alleging violation of the code provision relating to over-allowance on trade-in purchase, and against the Clark Oak Motor Co., alleging selling below the level established by the factory list price provision and violation of the discount or gratuity provision. It is also reported that injunctions have been obtained against three Boston dealers. In North Carolina, NRA reports Federal injunctions have been issued against the C. C. Disher Chevrolet Co. and Fred C. Justice, trading as the Justice Motor Co. Criminal complaints have been filed against E. M. Pipe Auto Co. of Dallas, Tex.

### ALB Holds Hudson Election Invalid

Elections held by the Hudson Employees Association were held invalid this week by the Automobile Labor Board on the ground that they did not have the Board's sanction. However, the Board permitted Hudson officials to recognize the representatives elected as representing employees in the association.

John Greer, former head of the Hudson A. F. of L. local, and head of the local under the new automotive labor union, characterized the ruling as a farce. The protest against the election was originally made by Mr. Greer.

### Pierce-Arrow Creditors Meeting Is Postponed

A meeting of Pierce-Arrow creditors scheduled for last Monday to discuss the proposed reorganization plans has been postponed until Oct. 22 upon agreement of all parties concerned. Hearings on creditors' claims will begin shortly before a special master to be appointed by Federal Judge Knight at Buffalo.

### Reo Motor Car Co.

Reo Motor Car Co.'s net loss on transactions in investment securities between Jan. 1, 1929, and Dec. 31, 1933, was \$10,982, ac-

cording to a statement on this matter sent to stockholders. Securities on hand Dec. 31, 1933, cost \$873,339; certain of these were redeemed prior to June 30, 1934, at a net gain of \$849. The remaining securities, which cost \$796,063, had market values totaling \$734,512, on June 30 of this year. Claims totaling \$3,915,154 were liquidated against closed banks to the extent of \$1,802,376, leaving a balance of \$2,112,777.

## N.Y. Show Space Drawing Oct. 3

### Committee Announces Rules of Procedure For Cars and Trucks

The drawing for passenger car and truck space at the coming New York Automobile Show will take place at 10:00 a. m. on Wednesday, Oct. 3, at show headquarters, Marlin-Rockwell Building, Madison Avenue at 46th Street, New York.

Under the ruling of the Show Committee, the drawing will proceed in the following order:

(a) Passenger Car Dealer Members of the Automobile Merchants Association of New York, Inc.

(b) Passenger Car Dealer Members of the Automobile Merchants Association of New York, Inc., for additional space.

(c) Truck Dealer Members of the Automobile Merchants Association of New York, Inc.

(d) Associate Members of the Automobile Merchants Association of New York, Inc., on a priority basis of length of membership in the Association.

(e) Members of the Motor & Equipment Manufacturers Association in accordance with the existing plan of that organization.

(f) Dealers in or Manufacturers of parts, accessories or automotive equipment on the basis of the number of years previously exhibited at the New York Show.

(g) All other applications for space will be handled on a basis to be designated by the Show Committee.

The allotment of accessory and shop equipment spaces will be made at a later date.

To participate in these first allotments, all applications should be in the hands of the management not later than Sept. 29.

## Market Value of Automotive Stocks Rising

	No. of Cos.	No. of Issues	Average Price	Total Shares Listed	Total Market Value
Car & Truck Mfg. Cos. (and Holding Cos.)					
Sept. '34	18	22	\$21.76	82,479,369	\$1,709,730,064
Aug. '34	18	22	20.22	82,479,081	1,667,917,621
Sept. '33	19	24	25.57	82,706,836	2,114,970,614
Parts & Equipment Mfg. Cos. (and Holding Cos.)					
Sept. '34	36	42	12.80	23,825,707	304,920,260
Aug. '34	36	42	11.37	23,811,625	270,711,155
Sept. '33	35	41	12.59	23,031,670	289,891,808
Entire Industry					
Sept. '34	54	64	19.75	106,305,076	2,099,650,324
Aug. '34	54	64	18.24	106,290,706	1,938,628,776
Sept. '33	54	65	22.74	105,738,506	2,404,862,422

## Ford Canadian Output Gains 100% In 7 Mos.

**Dollar Volume Increases 150%; Present Production Level to Be Maintained**

Business for the Ford Motor Company of Canada, Limited, for the first eight months of the present year has more than doubled that of the same period in 1933. Since January the unit volume has been approximately 35,000 units, according to W. R. Campbell, president. This compares with 14,000 during the same period last year. The dollar volume for this year was \$20,000,000 as against \$8,000,000 for the same period last year.

These figures include shipments to affiliated overseas companies, and indicate an average value of about \$571 per unit to the company. The usual seasonal decline in export business has not yet made itself felt this year, according to Mr. Campbell, and as a result employment is higher than for some years past. The average number of employees in the Canadian plant is estimated at 4500. The plant at East Windsor, Ont., and the assembly branches, including Toronto, will carry on at the present high-level production, it is understood, until well into the autumn.

## Pattern Makers' Strike Makes Little Progress

The pattern makers' strike covering the majority of all pattern shops in the Detroit area ended its eighth week Monday with practically no change in the situation. Little has been accomplished in attempts to effect a settlement between the job shops and the A. F. of L. union.

Contrary to statements during the early days of the strike, by Herman Heil, business agent for the pattern workers, that members in car plants would also be called out, no attempt has been made to secure a walkout at such factories.

A few pattern shops are operating on a limited scale but most of the pattern work normally accruing to the local job shops is being sent out of town. Moreover, car plants are doing somewhat more pattern work than normally.

## Steel and Tubes, Inc. Takes on Distributors

Steel and Tubes, Inc., have recently undertaken to establish distributors of electrically welded mechanical tubing in the important tubing centers of the United States.

The first warehouse stock of mechanical tubing established by Steel and Tubes, Inc., was that with Tubular Ser-

vice Corporation of New York, Philadelphia and Boston. Since then, stocks have been put in by Service Steel Company at Detroit, Williams and Company at Pittsburgh, The Hamilton Steel Company at Cleveland, and Edgar T. Ward's Sons Company at Chicago.

## The Average Citizen

*"Those who would measure confidence in this country in the future must first look to the average citizen."* President Roosevelt in Green Bay speech.

Who is the average citizen and what is he like? A New York economist who has dug into the statistics now comes out and tells us that the average American citizen has \$700 in the bank and \$1,100 worth of life insurance. Excluding the apartment dwellers in the larger cities, one out of every two average citizens owns his own home. Every average family owns an automobile. Stocks and bonds are owned by between eight and ten million average citizens and, indirectly, through bank deposits and insurance policies, four or five times as many average citizens are holders of industrial and government securities.

"The average man," says this economist, "is a capitalist. He has no patience with socialism or communism as he understands these philosophies, though recently he has been taking doses of both under misleading labels."

## Hillary Francis LaSage

Funeral services for Hillary Francis LaSage, Midwest zone manager for Chevrolet, were held in St. Paul's Cathedral, Omaha, last week. Mr. LaSage died suddenly at the home of his father-in-law. Surviving him are his widow and three children. They are Don, Marcia Ann and Carole Jean.

## GM Stockholders Gain

The total number of General Motors common and preferred stockholders for the third quarter of 1934 was 349,524 compared with 348,230 for the second quarter of 1934 and with 355,789 for the third quarter of 1933. There were 330,475 holders of common stock and the balance of 19,049 represents holders of preferred stock. These figures compare with 329,495 common stockholders and 18,735 preferred for the second quarter of 1934.

## Detroit Steel Mills At 75% of Capacity

**Note Production Gain At Plants in Other Automotive Districts**

Automotive demand for steel, while making a better showing than in the last few weeks, has not yet attained sufficient momentum to make possible uninterrupted operation of finishing mills. One of the large plants in the Cleveland area, catering largely to the needs of parts makers, shut down pending the accumulation of a sufficient backlog to permit of orderly operating schedules. On the other hand, Detroit mills continue to work at about three-quarters of their capacity and those in the Mahoning and Shenango valleys as well as in the Chicago district have recorded gains.

The American Iron and Steel Institute's figure of the rate of ingot output for the current week is 22.3 per cent, a gain of approximately seven per cent over the preceding week and of 21 per cent over the rate during the first week of the month.

Basing their calculations on what their field men in touch with automotive consumers have been able to learn regarding the latter's plans, steel producers have revised their expectations and are now reconciled to postponement of tonnage commitments by automotive buyers until later in the fourth quarter of the year. For the time being, agitation over prices has been shelved. It is a traditional practice in the steel market to lower prices only when by doing so business can be smoked out. Just now, as steel sellers see it, there is little in the way of worthwhile business overhanging the market. It remains to be seen what will happen when there is. Under Code rules, prices, once filed for a given quarter, cannot be increased, but they can be lowered in very short order.

**Pig Iron**—Activity is almost wholly confined to buying in single carloads. Prices seem to meet the views of both melters and sellers, but there is no incentive to stock.

**Aluminum**—Quiet and unchanged.

**Copper**—According to H. O. King, managing director of the Copper Code, 92 consumers, that use 95 per cent of the current consumption, have signed "Blue Eagle" buying agreements, and the remainder are expected to pledge themselves not to use any other but "Blue Eagle" metal in the course of the next few days. Still the thought that the quotation for copper that costs the American consumer 9c., delivered Connecticut point, to European buyers is 6.80 at 6.85c., c.i.f. Liverpool, Havre or Hamburg, is difficult to erase from buyers' minds.

**Tin**—Quiet. Spot Straits tin was quoted at 51.45c. at the beginning of the week, virtually unchanged from the preceding close.

**Lead**—At the beginning of the week there were still sellers at 3.70c. and at 3.75c., New York, but the lower priced offerings seemed to be taken up more readily, thereby giving the market a firmer undertone.

**Zinc**—Quiet and unchanged.

# The Horizons of B

**A**N unkind scribe has called attention to the fact that the President did not consent to dispatch troops into strike-ridden Rhode Island until the returns from the Maine election were in. Appreciating the distinction between editorial and news material, he carefully refrained from interpreting this curious phenomenon. Of a similar character is the news—not yet published—seeping through cocktail party channels in Washington that the Administration intends to issue another blanket order reducing hours of work throughout industry from 40 to 30 per week, and raising wage rates 33⅓ per cent. This will give four men jobs where but three had them before without impairing the purchasing power of the three that remain on the job.

While on the subject of Maine elections and Federal troops for Rhode Island, we hasten to add that the unofficial, and slightly alcoholized communiques stated that this action would not be taken until the eve of the A. F. of L. convention which meets Oct. 1. There is a glowing and growing resentment among labor leaders against the failure of the Government to crack down on the recalcitrant textile employers, the left-handed approval of the Houde decision by the President, and the agreement to send Federal troops into Rhode Island. Thus the further application of the A. F. of L. spread-the-work theory will act as balm upon the frazzled emotions of the labor executives. Careful pharmaceutical calculations in the offices of Mr. Farley indicate that the unguent will not wear off before the second of November.

## The 30-Hour Week by Executive Order

The action of the President will be taken under the authority of Section 10(B) of the Recovery

Act, to wit: "The President may from time to time cancel or modify any order, approval, license, rule, or regulation issued under this title; and each agreement, code of fair competition, or license approved, prescribed, or issued under this title shall contain an express provision to that effect." As has been noted in a previous discussion of this clause, the law gives the President the right to alter any term in any of the 700 codes now in effect. In the event that any startled employer invokes the Constitution, i.e. the old Constitution, the legal myrmidons of the Chief Executive will bring forth an individual contract (of which there are some 2,300,000) with the employer, signed while the latter was sober, under which he has abandoned his contractual rights.

True there are some rights not covered in these code agreements. The employer is left free to choose the color of his tie, to demand a better football team from his alma mater and object to his daughter's late hours. The codes merely cover wages, bargaining authorities, hours, capacity, output, cost of materials, selection of clients, prices, conditions of competition and a few other negligible items. It is to these conditions and these alone that the President's right of incontestable alteration extends. Except where labor unions, Government competition and the unplumbed provisions of the two security acts interfere, the entire remaining field lies within the discretion of management.

## The Revolt of the Intelligent

The garment manufacturers are still reeling from the double blow of the hour and wage ruling under Section 10(B) and the textile strike which the President's sacrifice of the garment operators failed to avert. However, plans of

resistance are rapidly crystallizing in other fields and some action has already been taken. In general, it is based upon a fear that the Administration will promote prosperity until the last business man has expired. The code authority of the retail solid fuel industry has resigned in a body. The National Boot and Shoe Manufacturers Association is trying to buy its freedom from code shackles by asking for the cancellation of every provision in their code except those dealing with maximum hours, minimum wages and child labor.

The Administration to date has ignored this unpatriotic gesture. The Houde Manufacturing Company is bearing up well under the loss of the Blue Eagle. To its support comes the National Manufacturers Association with overt instructions to defy the decision of the National Labor Relations Board regarding the exclusive right of the majority to represent all the workers. The organization of the Liberty League, the refusal of James M. Beck, able constitutional lawyer, to serve another term in Congress on the ground that he did not care to be one four-hundredth of a rubber stamp, are all accumulating symptoms of a revolt of the intelligent.

## Another California Boy Makes Good

The forthcoming elections and the future of the New Deal suggest the need for a correction from this commentator. In our Horizons of Business we referred to the primary victory of Upton Sinclair, to his prospects of official Democratic support and victory in November. It appeared at the time that the regular Democratic organization would disavow the California Socialist, that the President would snub him, courteously but firmly, that the elections would prove Sinclair to be



# Business

by Joseph Stagg Lawrence

—well—just a political accident.

This analysis reflected the sentiment in the capital at the time. It was made before the famous Hyde Park conference. Now it looks as though the great father has clasped the new guest to his bosom and made him a member of the family. The views of Mr. Sinclair and the President were not as incompatible as even the closest political intimates of the Chief Executive at the capital had supposed. Among the significant comments dropped by Upton when he emerged from the Hyde huddle was this, "I thought my ideas were original until I talked with Mr. Roosevelt."

The adaptable Californian has just announced some minor modifications in his program. The provision for an old age pension will be deferred, the exemption from real estate taxes for households lowered from \$3,000 to \$1,000. The plans for colonizing farms that real farmers could not cultivate and manning with the unemployed, idle plants that private management could not operate will be placed on ice. In every other respect this Socialist will now become a New Dealer. "It is no effort at all, thank you."

## Sinclair Plus Purge of New Dealers

This stride toward the left is to be weighed with the gradual purging of the New Deal hosts which has been taking place in Washington since the 4th of March, 1933. Professor Sprague was the first who found it impossible to leap from conservative pillar to liberal post with that agility which the policy of "bold and fearless" experimentation required. Peek has gone from the AAA. Douglas has finally capitulated and departed amid a presidential silence which shrieked discourtesy. Johnson is probably the next to go. The great leaders of

the Democratic party were never admitted to the council circle once the election was over. Owen Young, John W. Davis, Al Smith, Albert Ritchie, John Raskob, all these have been excommunicated. Baker and Baruch alone have hovered on the edges. The personnel which is left has three distinguishing traits—unquestioning loyalty to the chief, utterly elastic liberalism and a gentle heather gray of mediocrity.

## The Crystal Residue

Among those that remain three stand out as the personal counsel of the President. They are the residue left after 18 months of elimination. The silly notions of inconsistency which have disturbed the other advisers of the President and forced them one after another from his side have never been accepted by this triumvirate.

## Tugwell

First comes Tugwell, to whom the White House family circle has applied the intimate appellation of "Bolshy." Before a Senate committee and a gathering of newspaper publishers he has described himself as a conservative who recognizes the place of profit in the American economic system; that is to say, fair profit. He considers it the imperative duty of the Federal Government to eliminate poverty, the term being defined as a family income of less than \$2,000. The man himself points out that this embraces more than half the population. Although an economist who presumably should know that national as well as individual income consists of real goods and services rather than money and bank deposits, that a rising standard of living can be achieved only through increased production, he nevertheless is among those who believe that crop output should be severely cur-

tailed. It is only his narrow interest in the farmer which prevents him from applauding the NRA efforts to cut output.

## Hopkins

Second in this triune counsel is Harry Hopkins. Harry has done more to put the Government in business than any other agency, not even excepting the Tennessee Valley Authority. He has little patience with the ruthless law of competitive economics which demands that every man who would live must make his efforts sufficiently valuable to his brethren. Only thus will they permit him to participate adequately in the distribution of the national dividend. Such harsh doctrine is a part of the "tooth and claw era," repugnant to the fine social sense of Mr. Hopkins. Every man is entitled to a decent living. If he does not get it the responsibility rests upon society and not upon the man. Ethically, such a theory is debatable. Financially, no such doubt exists. It will certainly drive the nation into bankruptcy.

## Perkins

The last sage whose star is still in the ascendant is Miss Frances Perkins. She comes from conservative New England and in person exudes the chill frost of the Lowells, the Cabots and the Lodges. In the field of social economics she is as radical as the beans of Boston. She believes in strong, nation wide labor unions. Her conception of collective bargaining is on all fours with those of the A. F. of L. This notion she acquired from the English Webbs, Sidney and Beatrice. Since the employer is already organized, first in trade associations and now in the form of code authorities, it is up to the Government and the A. F. of L. to place the working man in the same position.

Aside from their theories the members of this high council have one thing in common. No one of them has ever been forced to make a practical, horny-handed living.

# Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

The textile strike continued to exert a strong depressing influence on business activity and business sentiment last week. The heavy industries, particularly, continued to operate at very low levels. In wholesale and retail trade, the effects of stimulating seasonal factors were more apparent, with increased business reported in numerous lines.

## Freight Loadings Fall 12%

The movement of railway freight during the week ended Sept. 8 showed the expected decline due to the holiday. Loadings for that period totaled 562,730 cars, showing a decrease of 83,050 cars, or 12.8 per cent, from the total for the preceding week and a decline of 15,203 cars, or 2.6 per cent, from that for the corresponding period last year.

## Retail Sales Increase

Preliminary figures on the value of department store sales show an increase from July to August of considerably more than the estimated seasonal amount. The Federal Reserve Board's index, which makes allowance for differences in the number of business days and for usual seasonal changes, was 79 in August, on the basis of the 1923-25 average as 100, as compared with 73 in July and 74 in June.

## Current Output Steady

Production of electricity by the electric light and power industry for the week ended Sept. 8 was 1.1 per cent below that for the corresponding period last year. It was also below that for the preceding week, which was 0.6 per cent below that a year ago.

## Corporate Earnings Double

Comparative figures of corporate earnings during the second quarter this year as compared with the same period a year ago, as made available by the Federal Reserve Bank of New York, show net profits in the corporation groups in the second quarter of 1934 of \$180,900,000, as compared with \$90,600,000 in the second quarter of 1933. Railroads and public utilities reported slight declines from last year's figures.

## Crude Oil Production

Average daily crude oil production for the week ended Sept. 8 was 2,404,450 barrels, showing a decrease of 17,700 barrels from the output of the previous week but exceeding the new Federal allowable figure, which became effective on Sept. 1, by 62,750 barrels.

## Fisher's Index

Professor Fisher's index of wholesale commodity prices for the week ended Sept. 8 stands at 79.9, as against 80.2 the week before, 79.7 two weeks before, 78.5 three weeks before, and 77.8 four weeks before.

## Federal Reserve Statement

Federal Reserve bank credit outstanding increased \$2,000,000 during the week ended Sept. 12. The monetary gold stock rose \$5,000,000 and member bank reserve balances \$41,000,000, while money in circulation declined \$10,000,000 and Treasury cash and deposits with the Federal Reserve banks decreased \$29,000,000.

plated advertising campaigns and plans for the enlistment of additional men to handle the fall volume and a general widening in the scope of dealer activities.

Other speakers were: W. M. Purves, assistant general sales manager; E. J. Poag, director of advertising and merchandising; F. H. Akers, director of sales; Russel Paige, director of service. J. D. Burke, director of truck sales, explained the important role played by the company's recently introduced low-priced standard 1½-ton truck in advancing Dodge truck sales to new high records.

## Wico Promotes Hart

Parmly Hanford has been appointed general purchasing agent of the Wico Electric Co., Springfield, Mass., to take the place of Harrison L. Hart, who was appointed mid-western sales manager with headquarters in Chicago. Mr. Hanford formerly held various responsible positions with Indian Motorcycle Co., and went to Wico four years ago. Mr. Hart has been with the company 22 years.

## NRA May Order Fines, Contributions Returned

NRA is expected shortly to issue an order directing dealer code administrative agencies to return all fines, voluntary contributions, etc., which have been collected from alleged code violators. Recognizing the doubtful legality of the procedure, some administrative agencies have been smart enough to earmark this money so that its return will involve no difficulties. In other cases, however, it is reported that the money has gone for code administration and in such cases its return may cause some embarrassment.

## August Rim Inspections

During August, 752,074 rims were inspected by the Tire & Rim Association, Inc., compared with 960,795 for the same month of last year. An increase of more than three million rims for the Jan.-Aug. period of this year was noted over the corresponding period of 1933. In the first eight months of this year 9,401,815 rims were inspected against 6,356,456 for the same period of last year.

## Gasoline Consumption Up

Consumption of gasoline in the first half of 1934 totaled 7,766,039,000 gallons, an increase of 7.45 per cent over the first six months of 1933, the American Petroleum Institute reports.

## Chrysler Yacht Explodes; Estimate \$20,000 Damage

Walter P. Chrysler's 42-foot yacht "Zowie," two small power boats, a canoe, boat house and duck hunting equipment were destroyed by fire last week. The fire occurred at the Chrysler estate near Cambridge, Md., on the Chesapeake Bay.

None was seriously injured, but two employees, William Pritchett, caretaker, and Grafton Wheatley, were thrown from the yacht when the explosion occurred. Pritchett and Wheatley had boarded the boat to condition it for Mr. Chrysler and a party of friends who were planning to use it later in the day for a fishing trip.

The exact cause of the explosion and fire is unknown, but it is believed the spread of gasoline following the blast caused the fire. Damage is estimated at \$20,000.

## Dodge Fall Campaign Discussed at Meeting

Plans for an extensive and intensive fall advertising and sales campaign for Dodge were discussed at a two-day meeting of factory executives and district managers in Detroit. A. VanDerZee, general sales manager of the company, presided at the conference.

Mr. VanDerZee outlined the contem-

## Maynard Joins Cummins

Walter A. Maynard has joined the Cummins Engine Co. as factory representative and will spend most of his time in mid-west and eastern parts of the



Walter A. Maynard

country. Following the World War Mr. Maynard worked with the truck sales offices of Packard and GMC trucks, and for 11 years was associated with the White Co. as sales manager for the Chicago region and sales promotion manager at the White factory.

## Fewer Pneumatic Casings Shipped During July

Shipments of pneumatic casings for the month of July amounted to 4,157,411 casings, a decrease of 20.5 per cent below June, this year, and 24.4 per cent below July, 1933, according to the Rubber Manufacturers Association, Inc.

This organization reports production of pneumatic casings for July to be 3,352,836 casings, a decrease of 22.8 per cent under June and 41.3 per cent below July, 1933.

Pneumatic casings in the hands of manufacturers July 31 amounted to 9,436,816 units, a decrease of 7.7 per cent below June 30, 1934, but were 37.9 per cent above stocks July 31, 1933.

### PNEUMATIC CASINGS

	Ship- ments	Produc- tion	Inventory
July, 1934 ..	4,157,411	3,352,836	9,436,816
June, 1934 ..	5,228,251	4,342,170	10,219,360
July, 1933 ..	5,497,191	5,713,626	6,844,006

## Texas' New Car Registration Up

New passenger automobile registrations in Texas continue to make a favorable comparison with those of last year, according to the University of Texas Bureau of Business Research. Registra-

tions in 15 Texas counties, representing all parts of the State, totaled 4,670 in August, against 4,407 in the corresponding month last year, a gain of six per cent; and against 4,870 in July of the current year, a decline of four per cent. For the first eight months of the year registrations totaled 35,332, a gain of 42.5 per cent over the corresponding period last year.

## Import Front Drive Car

A front-drive car of the Nationale Automobil Gesellschaft of Germany has been imported by the New York and Hanseatic Corporation and will shortly be demonstrated to manufacturers in the Detroit area. It is understood that three different German makes of front-drive car, viz., Adler, D.K.W. and N.A.G., are being manufactured under the patents covering this front drive.

## MRC Opens Frisco Branch

The Marlin-Rockwell Corporation, Jamestown, N. Y., manufacturers of M-R-C Ball Bearings have opened a factory branch at San Francisco, Cal. This branch will also serve as the San Francisco headquarters for the M-R-C Bearings Service Co., distributors of M-R-C Ball Bearings for automotive and industrial replacement purposes. James Ross Brown has been appointed branch manager.

The San Francisco branch will carry a full factory stock of M-R-C Ball Bearings for manufacturers, as well as industrial and automotive replacement types and sizes.

## NY Show Application Blanks Being Mailed

Space Arrangements Same As Formerly; Allotments Made Early Next Month

At the last meeting of its show committee, the Automobile Merchants Association of New York began its distribution of application blanks and space diagrams for the New York Automobile Show, to be held at Grand Central Palace, Jan. 5 to 12, 1935.

The spaces are laid out in the same manner as in former years, with the allotment of space in the automobile and accessory sections to be made early in October, and to include all dealers and manufacturers who file their applications prior to Sept. 29.

The direct management of the show is in the hands of Alfred Reeves, working with the show committee, which includes: William L. Colt, Dodge-Plymouth, chairman; Don Ahrens, Cadillac; A. E. deLoach, Pontiac; Lee J. Eastman, Packard; Theodore Luce, Lincoln-Ford; Walter Pepe, Chevrolet; G. O. Simons, Chrysler-Plymouth; George Stowe, Reo; C. B. Warren, Nash; C. K. Whittaker, Studebaker, and F. L. Yarrington, Buick.

## R. X. Raymond Transferred

R. X. Raymond has been appointed manager of the Minneapolis district office by the Chain Belt Co., according to a recent announcement from the company's headquarters. Mr. Raymond succeeds G. A. Gunther, who is transferred to the Detroit district.

## CALENDAR OF COMING EVENTS

### SHOWS

American Transit Assoc., Cleveland, Ohio .....	Sept. 22-27
Cleveland (Automotive Service Industries) .....	Nov. 19-23
New York Automobile Show .....	Jan. 5-12
Chicago Automobile Show .....	Jan. 26-Feb. 2
Automobile Merchants Assoc. of N. Y., Automobile Show .....	Jan. 5-12, 1935
Washington Automotive Assoc., Automobile Show .....	Jan. 12-19, 1935

### MEETINGS

American Chemical Society, Cleveland, Ohio .....	Sept. 10-14
American Welding Society, New York, City .....	Oct. 1-5
Natl. Aeronautic Association Meeting, Washington, D. C. ....	Oct. 11-13
American Trucking Association, Chicago .....	Oct. 22-24

### ANNUAL MEETINGS

Natl. Assoc. of Motor Bus Operators, Cleveland .....	Sept. 21-22
Natl. Safety Council, Cleveland, O. ....	Oct. 1-5
Institute of Traffic Engineers, Cleveland .....	Oct. 2-3
S.A.E. Annual Production Meeting Detroit .....	Oct. 10-11

### CONVENTIONS

American Society for Metals, New York City .....	Oct. 1-5
American Transit Assoc., Cleveland .....	Sept. 24-27
Natl. Wholesale Hardware Assoc. Annual Convention—Atlantic City .....	Oct. 22-25
International Foundry Congress, Philadelphia .....	Oct. 22-26
American Foundrymen's Assoc., Philadelphia .....	Oct. 22-26
Motor & Equip. Wholesalers Assoc. Annual Convention—Cleveland, O. ....	Nov. 16-17
National Foreign Trade Council, New York .....	Oct. 31-Nov. 2

### EXPOSITION

Natl. Exposition of Power & Mechanical Engineering (Biennial) New York, N. Y. ....	Dec. 3-8
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### FOREIGN SHOWS

Paris Automobile Salon .....	Oct. 4-14
London International Automobile Show .....	Oct. 11-20
International Aeronautic Exposition, Paris, France .....	Nov. 16-Dec. 2



# Tests Show Merits of Butane in Internal Combustion Engines

**B**UTANE ( $C_4H_{10}$ ), a paraffin hydrocarbon, for many years has been a by-product in the oil industry, and one which it has not been possible to easily dispose of. It has been used for some time as a substitute for artificial gas, particularly on California ranches where the installation of gas lines from a producing plant or distribution line was out of question.

During the past year a market has been developed for commercial butane, which contains about 20 per cent propane ( $C_3H_8$ ). The rapid strides which this market has made in the trucking industry and in stationary equipment along the Pacific Coast is primarily due to the low cost of this fuel to the consumer. The present cost differential between butane and gasoline will necessarily diminish with the increase in butane consumption; however, other advantages will remain and will make butane a strong competitor of gasoline in certain fields.

The accompanying table\* presents some of the characteristics of a few petroleum hydrocarbons, including butane:

The commercial mixture known as butane is a water-white, odorless, liquefied hydrocarbon which may be stored in tanks in accordance with the regulations of the Liquefied Petroleum Gases Safety Orders of the Industrial

\*Compiled from data presented in The International Critical Tables.

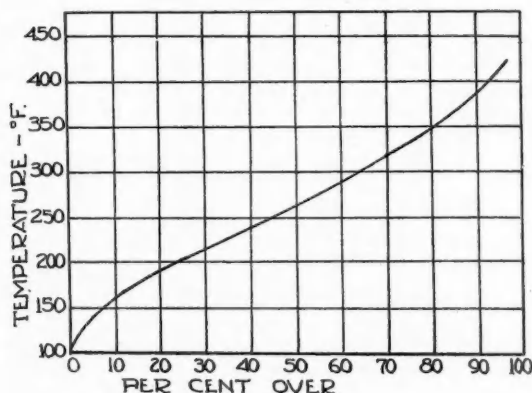


Fig. 1—A.S.T.M. distillation of the California straight-run gasoline which was used as a standard of comparison

Accident Commission of the State of California, which orders became effective March 12, 1934. Although stringent regulations for the use of butane may at first convey the impression of extreme hazards, it must be remembered that similar regulations exist for the handling of other petroleum products which today are hardly considered as hazardous. The above table shows the range of inflammability of butane, and it is evident that the hazards from this point of view are smaller in case of butane than with other hydrocarbon fuels.

The characteristics of commercial butane which make it superior to other available motor fuels are, firstly, its high octane rating, which permits of

the use of high compression ratios, with consequent improvement in engine performance; and, secondly, the fact that it enters the engine in the gaseous state, which makes crankcase dilution impossible, thus permitting of the use of lighter lubricating oils, a further source of efficiency in operation.

In order definitely to determine the proper spark setting, best mixture ratios, and products of combustion when using this fuel in an engine designed for liquid fuels, etc, the Department of Mechanical Engineering of the University of California at Berkeley undertook a program of experimentation on engine operating characteristics with various hydrocarbon fuels.

The experimental installation consists of a single-cylinder Christie variable-compression engine with 3 1/16 in. bore and 4 1/2-in. stroke. The engine is loaded with a 5 hp. shunt generator and having a lever arm connected to a torsion balance from which the load may be read off to within 0.01 lb.

Liquid fuels, measured with a gasoline burette, are admitted to a 1 1/4-in. Schebler carburetor mounted on one side of a synchronizing valve, to the other side of which is connected the 1 1/4-in. carburetor for gaseous fuels. Air is admitted to the carburetors from a 60-gal. surge tank which is fitted with a 0.462-in. diameter bell-mouthed orifice. From the pressure drop across the

## Characteristics of Petroleum Hydrocarbons

	Formula	Boiling Point °F	Specific Gravity 32°F	Lb. per gal. at 32°F	HEAT VALUE		Range of Inflammability in air Vol %
					BTU/Lb.	BTU/Gal.	
Propane.....	$C_3H_8$	-46.8	0.6259(-80°F)	5.22	20,060	104,715	2.17 to 7.35
Iso-butane....	$C_4H_{10}$	7.8	0.601	5.01	19,761	99,000	.....
n-butane.....	$C_4H_{10}$	32.5	0.601	5.01	19,761	99,000	1.55 to 5.7
Benzene.....	$C_6H_6$	175.4	0.90005	7.50	16,926	126,943	1.5 to 8.0
Octane.....	$C_8H_{18}$	258.4	0.71848	5.99	19,198	114,998	1.0 to ....

# Butane as an Engine Fuel

by C. J. Vogt

Asst. Professor of Mechanical Engineering,  
University of California

**O**WING to the growing use of butane as an internal combustion engine fuel in commercial vehicle and stationary power plant service, the results of the investigations reported here should prove both interesting and useful to engineers designing and producing engines for such service.

Briefly Prof. Vogt concludes from his tests that if the higher compression ratios permissible with butane are employed, engine performance will be improved. Although thermal efficiency is less than with gasoline, this is offset by the lower cost of butane and by the fact that lighter oils may be used, thus reducing friction horsepower. No change in spark timing is necessary. Slightly leaner mixtures than with gasoline should be used for best results. With proper precautions, butane is as safe as other petroleum fuels and the carbon monoxide hazard is not as great.

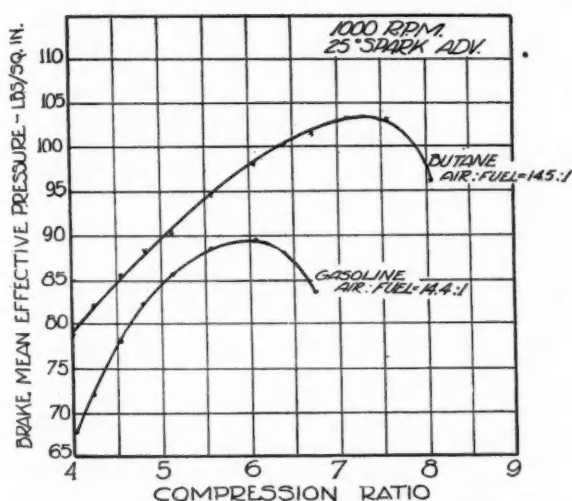


Fig. 2—The effect of compression ratio on power at open throttle when operating with commercial butane and California gasoline

orifice, the atmospheric temperature, barometric pressure, and humidity, the weight of air admitted to the engine may be determined.

Before being mixed with air the liquefied hydrocarbon fuels are passed through a pressure-reducing valve in the liquid state. In returning the liquid to the gaseous state the pressure is released, resulting in refrigeration and necessitating the application of heat to supply the latent heat of vaporization. This heat is supplied by a heater normally connected to the water outlet from the engine, but in the present tests the heat was supplied from a separate source. The gaseous fuel from the heater passes through a pressure regulator to an accurate dry gas meter reading to  $\frac{1}{8}$  cu. ft., then to a 60-gal. surge tank fitted with a manometer so that the pressures on both sides of the meter may be kept constant to enable accurate measurement of the weight of fuel used. From the surge tank the fuel passes through the butane carburetor to the engine. To switch the engine from a gaseous fuel to a liquid fuel it is only necessary

to throw the synchronizing valve from one side to the other.

A sampling tank is fitted to the exhaust manifold to procure samples of

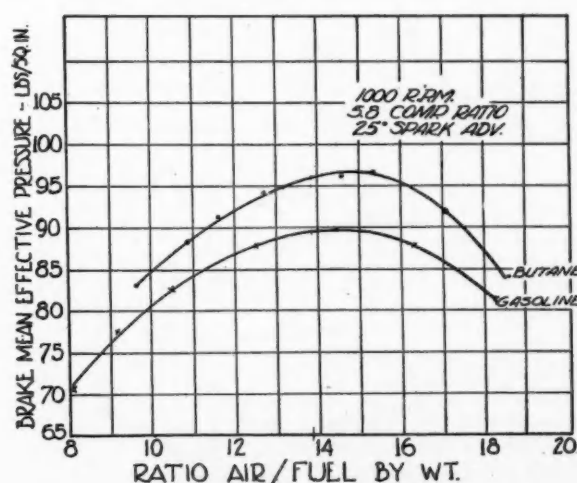
exhaust gas for Orsat analysis, and iron-constantan thermocouples are located in the intake and exhaust manifolds for the determination of intake and average exhaust gas temperatures.

The engine is also fitted for operation with natural gas composed of 78 per cent methane ( $\text{CH}_4$ ), 22 per cent ethane ( $\text{C}_2\text{H}_6$ ) and having a heat content of approximately 1180 BTU per cu. ft. This may be admitted between the pressure regulator and the gas meter.

The gasoline with which the butane was compared was a straight-run California gasoline containing no anti-detonating compounds. The gravity of the gasoline at 60 deg. F. was 58 A.P.I. and the A.S.T.M. distillation as shown in Fig. 1.

During all tests made the intake mixture temperature was held constant at 100 deg. F. and the outlet-water temperature from the cylinder jacket at 180 deg. F., while intake water temperature at 1000 R.P.M. was 82 deg.

Fig. 3—Characteristics of commercial butane and California gasoline when operating at various mixture ratios and open throttle



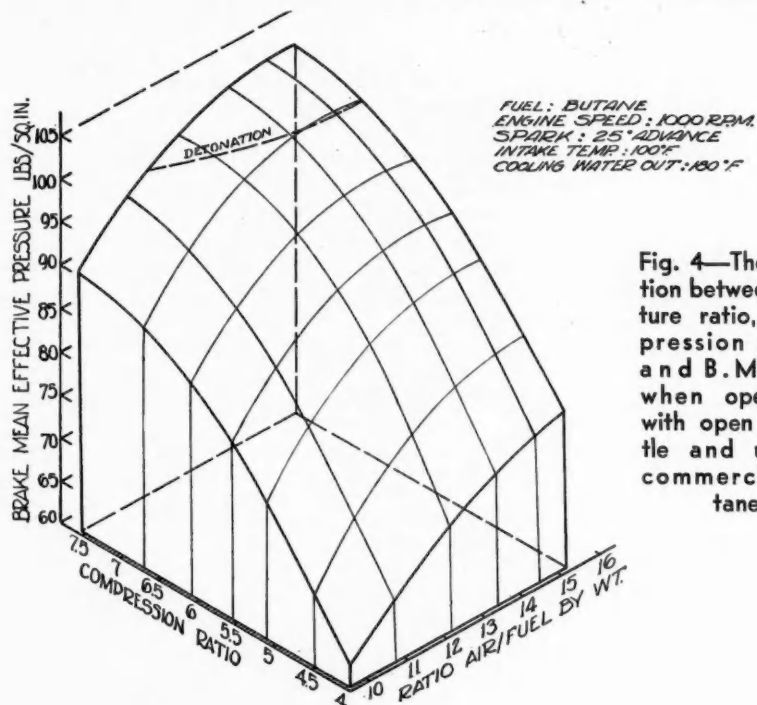


Fig. 4—The relation between mixture ratio, compression ratio, and B.M.E.P. when operating with open throttle and using commercial butane

F. All tests were conducted at full throttle. With these conditions, and the spark set accurately at 25 deg. advance, as determined with a protractor on the vertical shaft driving the camshaft, and checked with the fly-wheel graduations using a stroboscope, the brake mean effective pressure at 1000 R.P.M. was much higher for butane-air mixtures than for gasoline-air mixtures (Fig. 2). In these tests

the volumetric efficiency based on pounds of air taken into the engine in unit time was higher when operating with butane air-mixtures than when operating with gasoline. When the B.M.E.P. is reduced to lb. per sq. in. per lb. air supplied to the engine, gasoline shows a slight advantage over butane between compression ratios of 5:1 and 6:1. The volumetric efficiency should be higher with gasoline than

with butane, due to the drop in intake temperature upon vaporization of the gasoline. A reduction of data to unit weight of air is hardly justified, since the restriction in the standard gasoline carburetor is necessarily greater than that in a carburetor designed for a gaseous fuel. Hence the difference in volumetric efficiency may be attributed to the design of the necessary induction equipment and the results as shown in Fig. 2 considered as a characteristic comparison of the two fuels in so far as compression ratio is concerned.

The theoretical air-to-fuel ratio by weight for complete combustion of butane is 15.43:1, which for all practical purposes may be said to be the same as that for a good grade of gasoline from Western crude. Maximum B.M.E.P. occurs nearer the theoretical air-to-fuel ratio for complete combustion when using butane than when using gasoline, and indicates a more

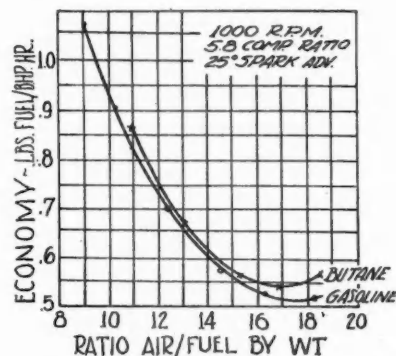


Fig. 5—The effect of mixture ratio on specific consumption when operating with commercial butane and California gasoline

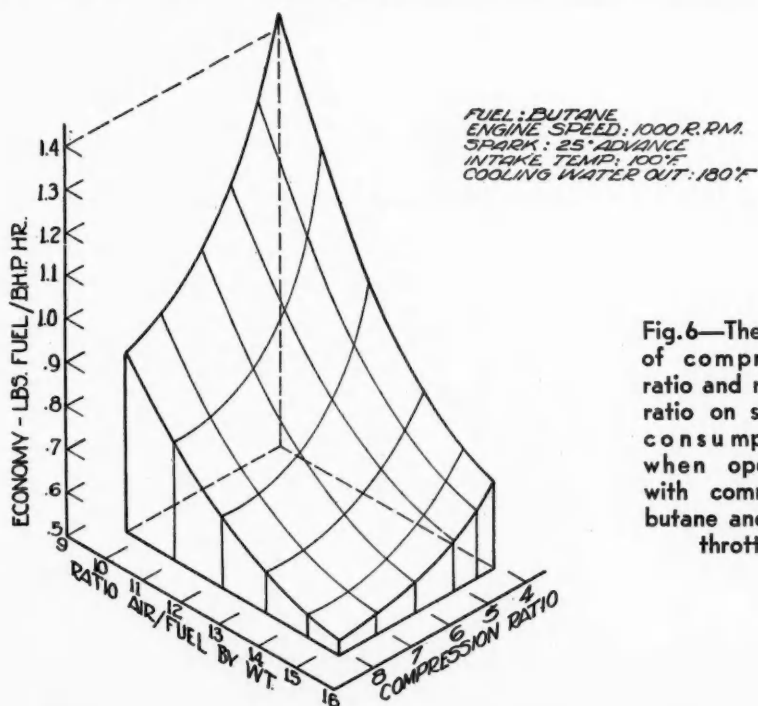


Fig. 6—The effect of compression ratio and mixture ratio on specific consumption when operating with commercial butane and open throttle

homogeneous mixture for butane-air mixtures than for gasoline (Fig. 3.) The greater B.M.E.P. with butane is again partly due to the higher volumetric efficiency. Smooth engine operation could not be obtained with as lean or as rich mixtures with butane as with gasoline, which is expected because of its narrower range of inflammability.

Fig. 4 shows the variation of B.M.E.P. for various ratios of air to fuel and compression ratios. The points at which mild detonation occurred—as determined with the Midgley indicator—are drawn on the surface with a dashed line.

Although the B.M.E.P. is higher for butane-air mixtures, the economy (lb. fuel per BHP-Hr.) is less than for gasoline (Fig. 5). This was also found to be true at higher compression ratios, as may be noted from the results of tests plotted in Fig. 6. However, at the present price of butane this fuel has a great advantage over gasoline on the basis of fuel cost.



### Spark Setting

At 1000 R.P.M., maximum power is obtained with both butane and gasoline with spark set for 25 deg. advance (Fig. 7). When using gasoline it was possible to operate with the spark retarded as much as 20 deg. after top dead center, while butane would not give satisfactory results with the spark set later than top dead center. This fact is evidence of the low rate of flame propagation in combustible butane-air mixtures as compared with combustible gasoline-air mixtures.

The relation between spark setting, compression ratio, and B.M.E.P. when operating with butane and an air-to-fuel ratio of 12.5:1 by weight is shown in Fig. 8, from which it may be noted that for all compression ratios the best spark setting is approximately 25 deg. before top dead center.

### Products of Combustion

The products of combustion from an engine operating on butane-air mixtures show slightly better characteristics from the standpoint of carbon-monoxide content than do the products from an engine operating on gasoline. Fig. 9 shows the comparison of the

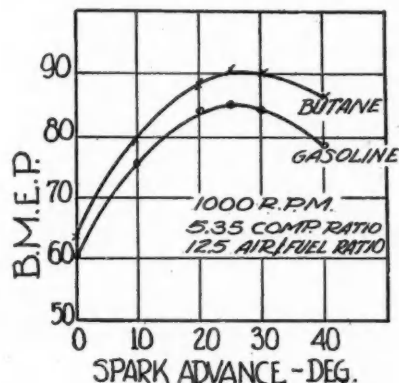


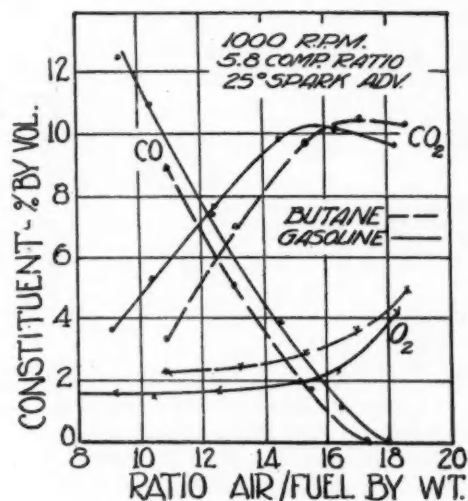
Fig. 7—The effect of spark setting on power when operating with open throttle and using commercial butane and California gasoline

products of combustion from the engine as obtained by Orsat determinations when the engine was operating under identical conditions. Variation of compression ratio appeared to have little or no effect on these results, nor did speeds between 650 R.P.M. and 1600 R.P.M.

The results of these investigations indicate that when used with proper precautions butane is as safe as a motor fuel as other petroleum products on the market, and is not as dangerous with respect to asphyxiation from carbon monoxide.

The performance of an engine is

Fig. 9—A comparison of the products of combustion (Orsat Analysis) for commercial butane and California gasoline



greatly improved if the compression ratio is increased to give the proper compression pressure to fully utilize the advantages of butane. Although the thermal efficiency is not as high with butane as with gasoline when operating at full throttle, the present cost differential more than compensates for this. Even with no cost differential the increase in power when using a lighter oil should practically balance

the difference in thermal efficiency and a net saving should be obtained by using a fuel which will not contaminate the crankcase oil.

Spark adjustment for best performance is practically the same with butane and gasoline. Likewise, the ratios of air to fuel by weight are practically the same for the two fuels, although with butane the mixture may be set slightly leaner for best results.

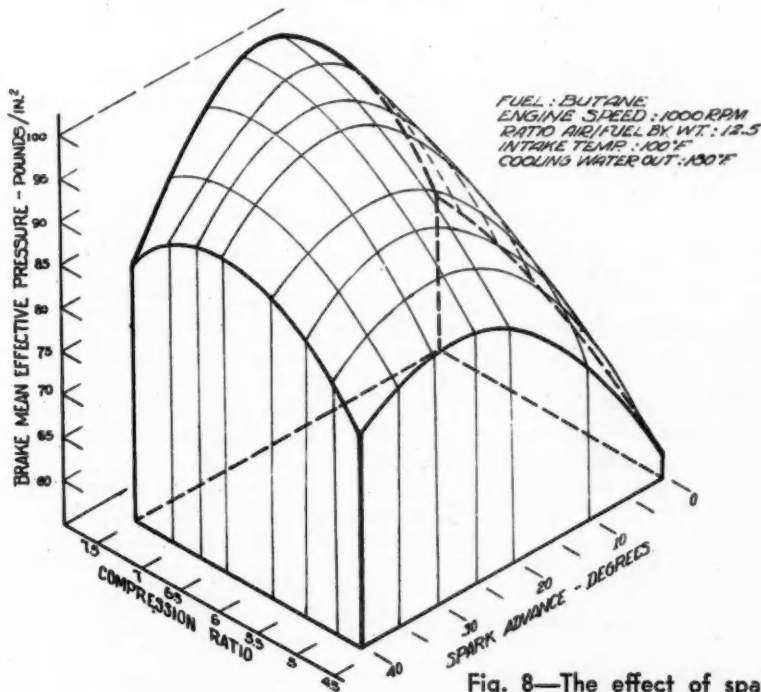


Fig. 8—The effect of spark setting and compression ratio on B.M.E.P. when operating with open throttle and using commercial butane

# Effects of Groove on Endurance of H

**T**ESTS recently conducted in our laboratories have proven to our satisfaction that proper design of grooves and fillets has a very definite effect upon the service obtained from such highly-stressed members as automobile and truck axle shafts.

We were led to make these tests because we were unable to find any definite information or standard as to the sizes of radii, necks or notches. It appears to be one of those minor operations that are left to the individual judgment of the designer. There is one point, however, on which all seem to agree—that radii are less likely to cause fatigue cracks to start than square or acute angles. The theory on which this belief is based is that sharp corners act as points of concentrated stress.

As fatigue is responsible for the majority of axle shaft failures, the tests described in this article were conducted in an attempt to get a clearer idea as to the correct design of the various portions of axle shafts susceptible to fatigue failure. All the specimens used were made from 3140 S.A.E. steel. This material was selected as having deep hardening characteristics and uniform structure throughout. The bars were heat-treated in the usual manner and drawn to 321 Brinell. They were turned and ground to a diameter of one inch, and then "necked" in the center, as shown in the accompanying drawings.

The test pieces were run on a rotating-beam fatigue-testing machine of the Farmer or Wöhler type, in which they were subjected to a surface stress of 77,000 lb. per sq. in. at the minimum diameter.

The following life values were obtained before ultimate fracture of the shaft:

- Fig. 1—81,000 Revolutions
- Fig. 2—75,400 Revolutions
- Fig. 3—19,000 Revolutions
- Fig. 4—14,450 Revolutions
- Fig. 5—13,530 Revolutions
- Fig. 6—13,800 Revolutions
- Fig. 7—12,650 Revolutions

by **Forrest F. Johnson**

Research Engineer, The Spencer Mfg. Co.

It is interesting to note that the specimen illustrated by Fig. 3, which has a square neck, showed 24 per cent greater endurance than that of Fig. 4, which has a radial groove. The square neck in Fig. 3 represents an angle such as is commonly obtained for grinding wheel clearance, and at the ends of threads. In spite of the fact that it has two sharp corners to act as stress raisers, it showed this very considerable increase in endurance over the radial groove design of Fig. 4, which has no sharp corners. This performance, we confess, was quite surprising to us. And yet the result can be quite logically explained. It is due to the fact that the square-necked piece had better distribution of stress. That is, the stress was allowed to play over the entire 0.1 in. of width, whereas the radial groove forced the stress to concentrate within a very small width at the bottom thereof.

## Better Distribution of Stress Desirable

This does not necessarily mean that a sharp corner is better than a fillet, but it may be better if the fillet reduces the available stress area to such an extent that the stress per unit of area is higher than it would have been had a smaller fillet or a sharp corner been used.

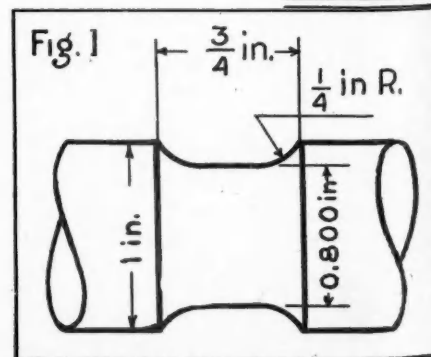
It is the writer's impression that

radii and fillets on shafts have received more than their share of attention in the past, while the aim of the designer should have been a better distribution of stress over the greatest possible area, by making the radii no greater than consistent with the idea above expressed.

For instance, we have come across many cases where a shaft actually could have been reduced to a smaller diameter at certain sections and still have shown much greater resistance to fatigue failure, if some of the lessons taught by these tests had been observed.

It will be noted that the specimen Fig. 2, which has a  $\frac{1}{4}$ -in. radial groove, showed 75,400 revolutions, while that of Fig. 5, which has a 60-deg. angular groove, similar to a V-thread, showed an average of only 13,530 revolutions. The explanation of the great difference between the endurance values of these two speci-

Specimens used in the endurance tests discussed in the accompanying article. The material was S.A.E. 3140 steel with a Brinell of 321. The tests were run at 1180 r.p.m. with a surface stress of 77,000 lbs.



# and Fillet Shapes Heat-Treated Steel

mens is quite obvious, as the stress is very much concentrated at the bottom of the sharp groove.

## Endurance Strength Tests Differ

Incidentally, these two test pieces bring out very strikingly the difference between the endurance and the strength of alloy-steel bars. For instance, both test pieces (Figs. 2 and 5) were composed of materials having the same physical strength, and both had the same cross-sectional area, so that under static load without vibration or fluctuation, both should have supported the same load before failure. However, under alternate or repetitive stress the two specimens gave widely different re-

sults, that of Fig. 2 showing approximately  $5\frac{1}{2}$  times the endurance as that of Fig. 5.

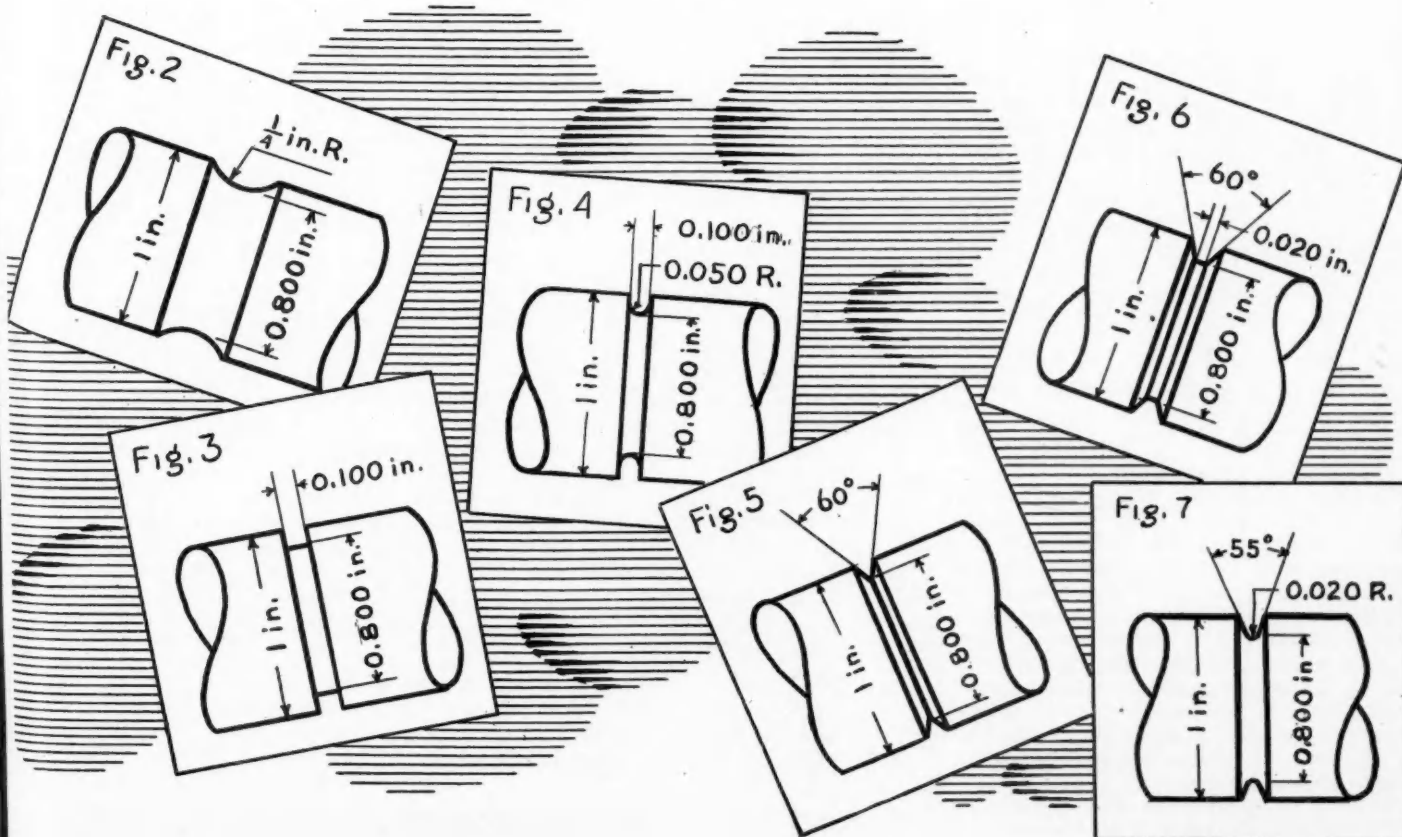
In addition to the tests referred to in the foregoing, in which a maximum surface stress of 77,000 lb. per sq. in. was used, we subjected the specimens of Figs. 2 and 5 also to a surface stress of 140,000 lb. per sq. in., which approaches closely to the ultimate strength of the material. At this extreme load the strength factor predominated and the result was a difference of only 3 per cent, whereas the lesser load showed the endurance of the specimen with the radial groove to be  $5\frac{1}{2}$  times greater.

It is obvious from the foregoing that the strength of a member is one factor, endurance another. However, the fact should not be lost sight of

that *both* factors are important in the design and manufacture of a product subjected to the peculiar strains of automotive axle shaft performance.

## Maximum Performance Depends on Correct Design

We appreciate the fact that we have touched but lightly on a subject which we feel warrants far greater research and more detailed study than we have been able to give it up to the present time. There is no question, however, that maximum performance can be obtained only by correct design and manufacturing practice with respect to the contour of fillets and recesses.





# Energy Distribution in the Internal Combustion Engine

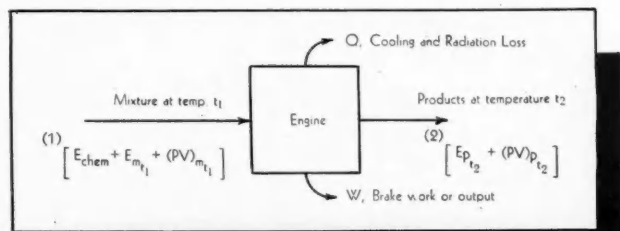


Fig. 1 — Energy-Flow Diagram

THE internal combustion engine process can be considered as a steady-flow process with mixture flowing in, products flowing out, shaft work being done, and energy being given up by the products to the cooling water or by radiation to the surrounding medium.

According to the law of the conservation of energy, the sum total of the energies entering a system must equal the sum total of the energies leaving, providing there is no change of energy in the system. Thus in Fig. 1, since there is no change in potential energy, and since the kinetic energy is negligible, the energy equation becomes

$$E_{chem} + E_{m_{t_1}} + (PV)_{m_{t_1}} = Q + W + E_{p_{t_2}} + (PV)_{p_{t_2}} \quad (1)$$

where  $E$  is the internal energy, either chemical or that due to molecular movement,  $PV$  is pressure times volume, which is the flow energy or work required to displace a unit mass of mixture or products moving toward or away from the engine, respectively; and subscripts  $m$  and  $p$  represent mixture and products respectively.

The sum of the molecular internal energy and the flow energy is defined as the enthalpy,  $H$ , thus

$$E + PV = H \quad (2)$$

Then equation (1) becomes

$$E_{chem} + H_{m_{t_1}} = Q + W + H_{p_{t_2}} \quad (3)$$

It would appear from this that the engine should be charged with the chemical energy and that this energy should appear in the cooling loss, the brake work and the difference in the enthalpy of the products at temperature  $t_2$  and the mixture at temperature  $t_1$ . However, it is customary to charge the engine with the heating value of the fuel which is determined by burning the fuel in a calorimeter and determining the heat given off in cooling the products of combustion practically to the initial temperature.

A constant pressure calorimeter will be considered, since it is desirable to

consider the energy leaving the engine in the exhaust products as the heat which would be given up in cooling the products at constant pressure from temperature  $t_2$  to temperature  $t_1$ . Applying the energy equation to the constant-pressure calorimeter, in which no work is done and in which the products are cooled to temperature  $t_1$ ,

$$E_{chem} + H_{m_{t_1}} = Q_{const. press.} + H_{p_{t_1}} \quad (4)$$

from which the heating value at constant pressure is

$$Q_{c.p.} = E_{chem} + H_{m_{t_1}} - H_{p_{t_1}} \quad (5)$$

Subtracting the term  $H_{p_{t_1}}$  from both sides of equation (3), makes the left side equal to the constant-pressure heating value in equation (5). Thus

$$E_{chem} + H_{m_{t_1}} - H_{p_{t_1}} = Q + W + H_{p_{t_2}} - H_{p_{t_1}} \quad (6)$$

or

$$Q_{c.p.} = Q + W + (H_{p_{t_2}} - H_{p_{t_1}}) \quad (7)$$

The right hand side of equation (7) shows the energy distribution to be in three distinct groupings, the summation of which is normally termed the heat balance, which should equal the energy charged against the engine. Thus,

1.  $Q$ , the heat carried away by the cooling system and radiation,
2.  $W$ , the shaft work,
3.  $(H_{p_{t_2}} - H_{p_{t_1}})$ , the enthalpy<sup>1</sup> in the

products leaving the engine above that of entering temperature. This term represents the heat which is given up by the products to the surroundings in cooling at constant pressure from exhaust temperature  $t_2$  to the initial temperature  $t_1$ .

If the foregoing distribution is used, equation (7) shows that the engine should be charged with  $Q_{c.p.}$ , the heat of combustion of the fuel at constant pressure.<sup>2</sup> Engine friction does not enter into the analysis, since friction merely changes the final energy distribution, reducing the available energy ( $W$ ) and increasing the cooling and radiation loss and products energy.

It can be shown<sup>3</sup> that the engine should be charged with the heating

<sup>1</sup> Tables of enthalpy have been computed and are given on p. 43 of the 4th ed. of Internal Combustion Engines, by Streeter and Lichty.

<sup>2</sup> This checks the conclusion reached by another method some time ago by Goodenough and Felbeck, Bull. 160, Univ. Ill., Eng. Exp. Sta.

<sup>3</sup> See p. 428 "Principles of Engineering Thermodynamics," by Kieffer and Stuart.

THE customary procedure of the majority of writers on the subject of heat balance is erroneously to include the friction loss, which is shown in this paper to be included in the three losses termed exhaust, cooling system and radiation losses. A typical published example shows how misleading a conclusion can be when based upon the common erroneous method employed.

The application of the energy equation to the internal combustion engine process proves that the engine should be charged with the heating value of fuel at constant pressure at the initial temperature, when the energy leaving in the exhaust products is determined on the customary basis of cooling the products at constant pressure down to the initial temperature. This is opposed to the usual procedure of charging the engine with the heating value of the fuel at constant volume merely because the combustion part of the process occurs practically at constant volume.

# Internal Combustion Engine

by L. C. Lichty  
Assoc. Prof. Mech. Eng.,  
Yale Engineering School

value of the fuel at constant volume at  $t_1$ , but in that case the exhaust loss must be computed by the imaginary process of cooling the products in the cylinder, at the end of the expansion stroke, at constant volume down to the initial temperature. Since this does not actually occur, and, also, since the heat balance is never determined on this basis, it seems illogical to thus charge the engine.

A study of the energy changes in an engine (Fig. 2) shows that the heat balance is of no particular value except to indicate the distribution of energy leaving an engine. The mixture has a definite amount of energy to which is added the following:

1. Energy from exhaust gases.
2. Energy from hot cylinder walls.
3. Energy from hot clearance gases.

After the combustion process and closed parts of the cycle (before the exhaust valve opens) the total energy is divided into three groups:

1. Work on piston.
2. Losses to cylinder walls.
3. Energy in products.

The piston work divides into work output and friction. Some of the fluid friction or pumping loss joins the exhaust loss. The remainder of the fluid friction and the piston and ring friction join the cooling loss, while the remainder of the friction is dissipated by radiation from the various unjacketed parts of the engine.

The exhaust products leaving the cylinder lose some energy to the cooling system around the exhaust port walls, and leave behind some energy in the remaining clearance gases. Some energy is transferred as heat from the products to the incoming mixture. Also, some energy is lost by radiation from the exhaust manifold, assuming the products energy is determined at some point beyond the exhaust ports. Some of the manifold radiation is absorbed by the water jacket. The products usually contain some unburned fuel, which loss is included in the exhaust loss.

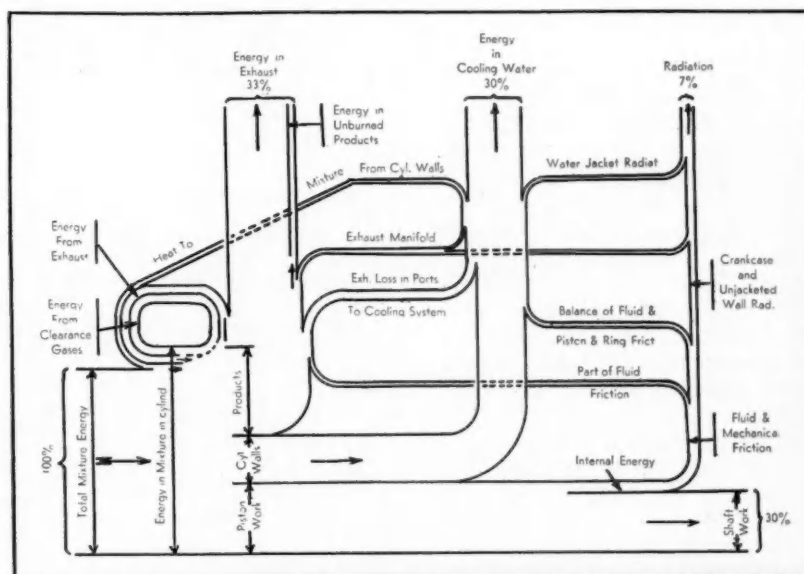


Fig. 2—Energy distribution diagram for I. C. engine

The cool incoming charge absorbs some heat from the walls and consequently reduces the energy in the cooling water. Also, some radiation or heat loss occurs from the jackets to the surrounding air.

Thus, the interchange of energy in an internal combustion engine is somewhat complicated, and none of the friction loss appears as such in the final distribution of energy. Any heat balance which includes the friction as a part of the indicated horsepower will form a basis for erroneous conclusions, unless the part of the friction included

From the foregoing it was concluded "That as the load is reduced a greater proportion of the exhaust heat appears in the cooling water."

As the load is reduced at constant speed by throttling, the total friction horsepower probably increases due to the increase in pumping loss. However, assuming a constant friction horsepower resulting in a mechanical efficiency of 0.85 at maximum I.H.P., the brake horsepower at the various loads in per cent of maximum I.H.P. and the correct heat balance, neglecting pumping loss changes, would be as follows:

Per Cent of Max. I.H.P.	100	80	60	40
B.hp. in per cent of Max. I.H.P.	85	65	45	25
Ratio of Br. T. Eff. to In. T. Eff. (Mechanical Eff.)	0.850	0.813	0.750	0.625
Brake Work, per cent	28.5	27.6	25.6	21.0
Cooling, per cent	26.5	28.2	31.8	35.5
Exh., Rad., and Unaccounted for, per cent	45.0	44.2	42.6	43.5
Total Heat	100.0	100.0	100.0	100.0

in the measured cooling water loss as well as in the exhaust is known. Taking a published example of a heat balance obtained at constant speed by throttling the engine:

Percentage of Max. I.H.P.	100	80	60	40
Heat to I.H.P., per cent	33.5	34.0	34.1	33.5
Heat to Cooling Water, per cent	26.5	28.2	31.8	35.5
Heat to Exh., Rad., etc., per cent	40.0	37.8	34.1	31.0
Total Heat	100.0	100.0	100.0	100.0

It thus appears that the exhaust, radiation and unaccounted for item is practically constant, decreasing from 45 to 43 per cent. The brake work decreases from 28.5 to 21.0 per cent, while the cooling loss increases from 26.5 to 35.5 per cent. Obviously, a greater portion of the work appears in the cooling water while the exhaust-etc. loss remains practically constant while throttling this engine at constant speed.

# Accuracy of 0.1 A German Balanced-P

A NOVEL balanced-pressure indicator has been developed by Richard Brandt and Heinrich Viehmann of the German Institute for Aeronautical Research and is described by them in that Institute's Report No. 322. It is based on a maximum-pressure indicator previously used by these investigators in research work on high-speed carburetor and Diesel engines. The principal element of the maximum-pressure indicator is a diaphragm chamber (Fig. 1), the body of which is provided with a spark-plug thread, so that it can be screwed into a spark-plug hole.

Directly above the diaphragm there is a rod which is insulated from the body of the diaphragm chamber and serves as a stop for the diaphragm. Compressed air can be admitted to the chamber above the diaphragm, through a reducing valve, and the pressure maintained at any desired value. The pressure of combustion acts in opposition to this counter pressure, and when the counter pressure is overcome, the diaphragm is deflected and an electrical contact is established between it and the rod above it. In this way a circuit is closed which includes a source of current and an electric glow lamp. When the circuit is closed as the combustion pressure begins to exceed the counter pressure, the glow lamp lights up, and it remains lighted as long as the former exceeds the latter.

For maximum-pressure measurements a compressed-air bottle is con-

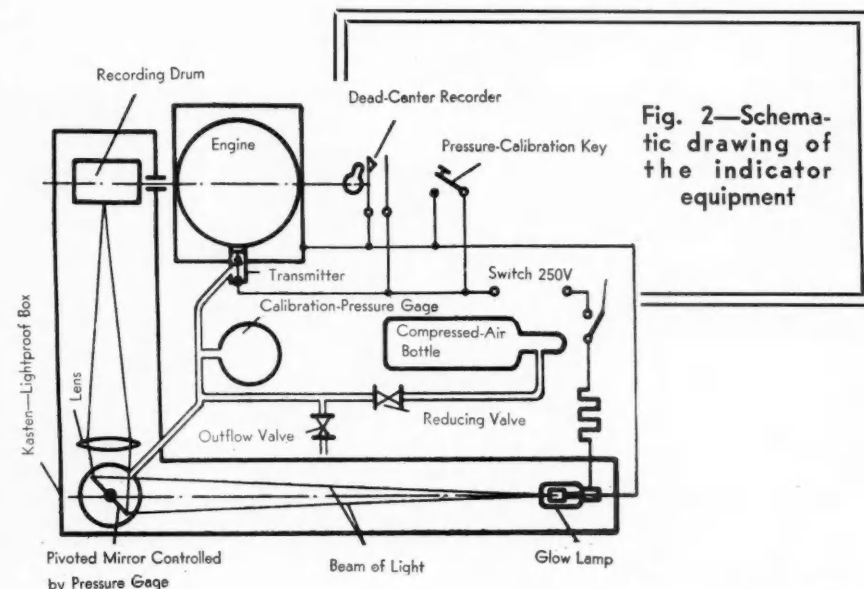


Fig. 2—Schematic drawing of the indicator equipment

nected to the diaphragm chamber through a throttle valve, a pressure gage being connected to the line between the throttle valve and the chamber. One terminal of a 220-volt source of current is grounded to the engine, while the other terminal is connected through the glow lamp to the insulated rod or terminal in the diaphragm chamber. In operation the air pressure in the diaphragm chamber is increased gradually until the glow lamp ceases to

light up. The pressure then indicated by the gage is the maximum combustion pressure.

This instrument is claimed by its sponsors to be accurate to within plus and minus 0.1 atmosphere. This high degree of accuracy is credited to the small mass of the diaphragm and its small range of motion. The diaphragm is only 0.004 in. thick and 0.36 in. in diameter. Deflections of the diaphragm are limited by the stops to from 0.0025 to 0.0040 in., hence there are no appreciable reactions of the instrument on the phenomenon to be measured. The glow lamp is said to be practically inertia-free.

When it is desired to use the transmitter described in the foregoing for the purpose of recording engine-pressure cycles, the arrangement shown diagrammatically in Fig. 2 is made use of. A glow lamp with a very compact source of light of high luminous intensity produces a point of light on a photographic paper applied to a drum mounted on an extension of the engine crankshaft, the rays from the source being condensed by a lens. The glow lamp is kept

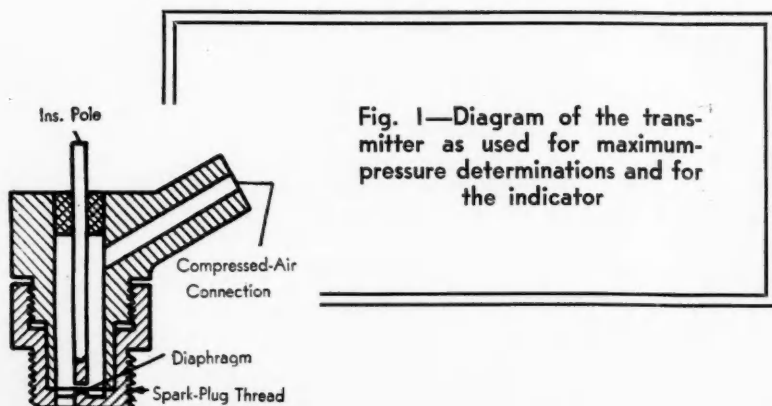


Fig. 1—Diagram of the transmitter as used for maximum-pressure determinations and for the indicator



# Atmosphere Claimed for Pressure Type Indicator

lighted by the "transmitter" as long as the pressure in the combustion chamber exceeds the calibrated counter-pressure, and during this period the point of light describes on the indicator card (which turns with the crankshaft), a straight line parallel with the axis of abscissas. The counter pressure can be recorded in a very simple manner by deflecting the beam of light in a direction perpendicular to the plane of crank motion by means of a mirror which may be moved around its axis by a pressure gage, for instance. In this way a line is drawn during each revolution of the crank, whose distance from the axis of abscissas is proportional to the momentary counter pressure and whose length shows during what portion of the stroke the pressure in the cylinder was greater than the counter pressure.

If the counter pressure is changed only slightly from cycle to cycle, between the limits of the pressures reached in the combustion chamber, the indicator produces a plane surface composed of straight lines whose outline represents the mean of a number of successive pressure-time diagrams. Fig. 3 is a diagram taken in this manner.

A pressure scale is readily inscribed on the diagram by means of

the pressure-calibrating button shown in Fig. 2, the pressure being simultaneously read off on an accurately calibrated pressure gage not included in the assembly diagram. The dead-center position is marked on the diagram by means of a cam secured to the crankshaft, which closes an electric contact momentarily during each revolution of the crankshaft. In this way a series of points is marked on the diagram, forming a smooth, straight vertical line.

If it is desired to draw diagrams of the inlet and exhaust strokes, during which the pressure is at times below atmospheric, it is necessary to apply suction to the outflow valve (Fig. 2).

Pressure diagrams corresponding to two different points of the combustion chamber, as, for instance, the ante-chamber and the cylinder proper of a Diesel engine of the pre-combustion-chamber type, can be taken simultaneously and superposed one upon the other by inserting a "transmitter" into the wall of each chamber and connecting the two in parallel, with a resistance in the circuit of each, to the same glow lamp (Fig. 5). The two resistances being connected in parallel, the effective resistance in the lamp circuit is reduced, more current flows, the

lamp brightens up, and the corresponding portion of the diagram becomes darker. With the different shadings of various portions of the diagram it is then an easy matter to trace the curves of pressure variation at the two points respectively.

With respect to the accuracy of the instrument and its freedom from disturbance by inertia effects and reaction on the engine cycle, it is pointed out that the pressure diaphragm has a frequency of vibration of 100,000 cycles per second. This is so high that no detrimental influence on the diagram need be feared. The glow lamp (evidently a neon lamp) may be regarded as inertia-free from the standpoint of this application, according to the sponsors of the instrument, and the motion of the deflecting mirror (10 deg. per min.) is so slow that its inertia can have no influence on the results. It is essential, however, that the motion of the mirror be steady and reproducible.

If in tracing diagrams with this instrument the counter pressure is always changed in the same direction (downwardly, for instance), inaccuracies of the pressure indicators due to hysteresis and elastic reaction are eliminated.

By mounting the indicator drum directly on the crankshaft, an accurate record of crank motion is obtained. In cases where it is impossible to do this the drum may be mounted on a shaft driven from the crankshaft through an elastic coupling, which at the same time in-

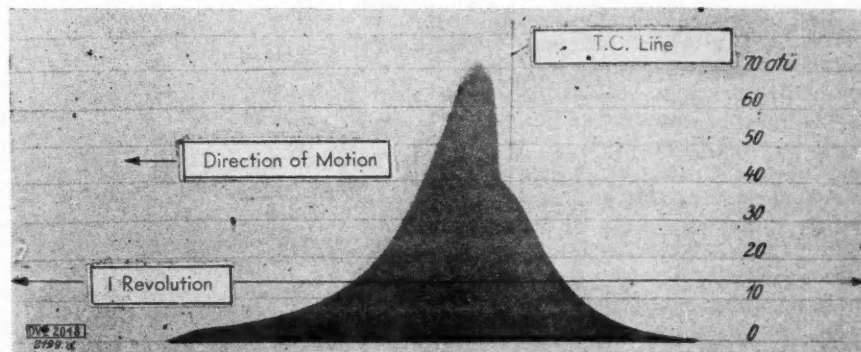


Fig. 3 — Pressure-time diagram of a Junkers double-piston engine at 970 r.p.m.

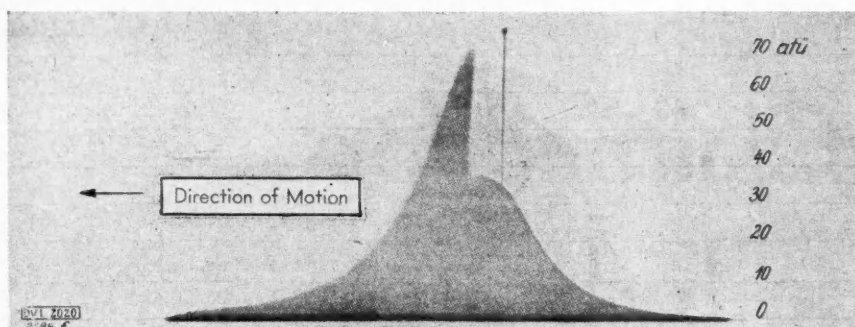


Fig. 4 — Pressure-time diagram from the same engine but with different fuel and at 600 r.p.m.

ulates it against engine vibration. The time record, however, is then less reliable. The remainder of the apparatus can be always so installed that it is not affected by engine vibrations.

The most highly stressed part of the indicator is the diaphragm of the transmitter, which has to act as an interrupter for a current of 10-20 milli-amperes at 220 volts. The builders of the instrument state that their first plan was to use the transmitter as the actuating element of a Farnboro indicator, but it was found that the relatively large current which had to be interrupted destroyed the diaphragm in short

By means of the reducing valve the counter pressure on the diaphragm is adjusted to a point a little higher than the estimated maximum pressure of the combustion process. After the reducing valve has been closed, the outflow valve is opened, which allows the air in the space be-

a research project on motor fuels. Differences between them are due to the use of different fuels and different speeds. One slight defect in the diagrams is that the dead-center line is not absolutely perpendicular to the pressure-calibration lines, but this fault is said to have been eliminated in an improved model of the instrument recently completed. That the diagrams here shown are reversed, with the time scale or crank-motion scale extending from right to left, instead of from left to right, is probably due to their being negatives of the originals. It is preferable, of course, that the diagrams in the form in which they are to be principally used (originals or reversed prints from same) read from left to right, since engine diagrams always have been traced that way.

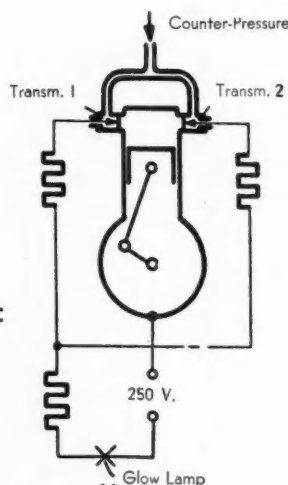


Fig. 5 — Arrangement for making curves of pressures at two points of the combustion chamber simultaneously

order. With the small current required in this instrument the wear and tear is so slight that after continuous operation for eight hours no deterioration of the diaphragm through electrical stresses was perceptible.

This is the basis of one of the two principal advantages claimed for the instrument by its originators, which is that the maximum switching capacity obtainable from the diaphragm directly is so concentrated in a point-like source of light in the glow lamp that it is possible to produce easily recognizable marks on the sensitive paper. The other advantage claimed is that the instrument may be operated by a dry-cell type of radio B battery.

The procedure in taking diagrams with this instrument is as follows:

tween the reducing valve and the diaphragm to escape until atmospheric pressure is attained. At a speed of 1500 r.p.m. this takes about 1 minute, and during this period the glow lamp is cut in and produces the diagram.

While the counter-pressure is thus ebbing off, the pressure-calibration key is depressed as the pointer of the calibrated pressure indicator passes successive multiples of 10 atmospheres, with the result that each time a horizontal line is drawn extending the whole width of the diagram. The distances between these pressure calibration lines are closely uniform, which is of great help in evaluating the diagrams.

The two diagrams reproduced herewith were taken on a Junkers double-piston engine in the course of

MULTIPLY by three the results obtained from the N.A.C.C. horsepower formula and a fair approximation of the maximum horsepower output of 1934 passenger car engines is obtained.

In other words, to fit today's conditions this formula should be

$$\text{Horsepower} = \frac{n D^3}{0.744}$$

which compares with the N.A.C.C. formula originally adopted in 1904 which follows:

$$\text{Horsepower} = \frac{n D^3}{2.5}$$

It will be noted that the original divisor, 2.5, is 3.36 times as great as in the equation for 1934; hence when applied to this year's engines, the result obtained from the old formula is only one-third of the actual power output.

In 1925, a divisor of 1.16 and in 1930 one of 0.854 was necessary for the engines of those years.

NOTE— $n$  = number of cylinder;  $D$  = cylinder diameter.

# The Forum

## An Electrical Transmission in Place of Usual Gear Train

Editor, AUTOMOTIVE INDUSTRIES:

Your recent issue carries a communication from Russel W. Todd, entitled "Why an Automatic Transmission Anyhow?" which discusses extensively the status of automatic transmission.

The remarkable part of this exhaustive analysis is the brevity with which electric transmission is summarily dismissed, as follows: "The variation in (gear) ratio might be some continuously variable type; or could derive from hydraulic or electric reduction. However, practical considerations of simplicity, compactness and ruggedness seem to eliminate these possibilities and point to a more or less conventional arrangement of gear trains."

The various points and examples discussed appear to indicate that the objective which automotive engineers are striving to attain is the fully automatic transmission—which is inherently secured by electric equipment—but with the initial stipulation that it must be secured with mechanical devices.

At the risk of repeating statements that are quite generally known in this connection, I would like to call attention to the following facts:

1. Electric transmission for automotive vehicles is to date the only really satisfactory and practical means of securing full automatic transmission.

2. Full automatic electric transmission has been used for many years in this country as follows:

- a. More than 2000 gas-electric buses.
- b. More than 700 gas- or diesel-electric rail cars.
- c. More than 150 diesel-electric locomotives.

Electric transmission from an internal combustion engine to the wheels of the vehicle has demonstrated its ability to "operate smoothly, quietly, without effort on the part of the driver and does the right thing at the right time." To

quote Mr. Todd again, "its range of intelligence takes into account all that the engine does."

The inherent design of the generator and electric motors adapt them automatically to keeping the engine working in its proper and effective range. An accurate definition of electric drive would be (quote again) "Climbing hills, idling in traffic, quick rushes to get around another car, fast acceleration, gentle acceleration—all are correctly met by

a transmission which acts according to engine speed and load."

With electric transmission the operator simply steps on the gas from start to top speed, and a simple switch provides for reverse movement.

In view of the above and with the obviously receptive attitude of the buying public, I am frankly puzzled at the reluctance of the automobile industry to seize upon this simple solution. The good book somewhere says, "If thine eye offend thee, pluck it out." Why not "pluck" out the conventional train of gears that is admittedly so inadequate to supply the needs of the time?

W. D. BEARCE,  
Transportation Engineering  
Dept.,  
General Electric Co.

## Factors Determining the Optimum Spark Timing

Editor, AUTOMOTIVE INDUSTRIES:

From time to time there has been printed in *Automotive Industries* short notes as to the effect of spark timing. For instance, I believe in connection with Chrysler cars it was stated that starting was helped by having ignition take place slightly ahead of top dead center. Also in connection with the announcement of the octane selector on the Chevrolet, mention was made that maximum power was always obtained when spark was advanced to the knocking point. I would very much like to see printed a complete article on this subject. Curves showing the knocking point at various speeds of a given engine and fuel would be interesting. Also, what spark advance would give most power with a knockless fuel of pure benzol? What is the effect of advancing the spark on economy? What is the best timing for part throttle operation?

HENRY F. ROBBINS.

The subject referred to has been covered in a number of articles in *Automotive Industries*. The relations between optimum spark advance, engine speed and inlet manifold vacuum in a number of dif-

ferent engines were illustrated by curve sheets in a paper by R. S. Rowell and C. G. Williams printed in *Automotive Industries* of Aug. 10, 1929. In the July 18, 1931 issue there appeared a communication from Clark C. Minter and William J. Finn of the Texas Company's Research Laboratory, in which the rule was laid down that the optimum spark advance is directly proportional to the clearance volume. In other words, the higher the compression the less the spark advance required.

This finding was corroborated by A. W. Pope, Jr., of the Waukesha Motor Company in a letter appearing in the Sept. 26, 1931, issue, in which it was stated that in 1929, when an advance-control linkage was being developed for the C.F.R. engine which would automatically give the optimum spark setting for any compression ratio at which the variable-compression cylinder might be set, it was found that the spark advance required was proportional to the compression chamber volume.

In the course of this work curves were plotted showing the relation between the compression ratio and the optimum spark advance. The ex-



perimental work, moreover, was done with an aromatic fuel of high anti-knock value.

Papers covering this development work were presented by H. A. Horning, to the S.A.E. in Detroit in 1931 and the American Petroleum Institute in Chicago in 1930.

The question of anti-knock values of different fuels was covered in an article by Sandor D. Rubenz in *Automotive Industries* of July 5, 1930. Instead of determining the spark advance which the engine would stand with different fuels, the spark advance was fixed (30 deg. advance) and the minimum inlet manifold vacuum (that is, the maximum throttle opening) which could be used without knocking, or the one

at which knocking was just perceptible, was determined.

This article contains charts of equal-knock lines for the variables manifold vacuum and compression ratio and for r.p.m. and fuel quality (per cent of benzol in a benzol-aviation gasoline mixture).

It is evidently impossible to say that any given fuel, such as benzol, will stand a given maximum spark advance without knocking, because the permissible spark advance depends not only on conditions of operation, such as load, speed and mixture ratio, but also on the form of the combustion chamber, the location of the spark plug, and probably also on the materials of the cylinder head and piston.—Editor.

driver, the H principle has not been altered or simplified fundamentally. To me, the H arrangement seems only an abridgment of four different levers. It offers no logical continuity of lever positions to correspond with the lever functions. In place of the H arrangement, why cannot all the speeds be obtained progressively with a continuous-motion lever whose positions would be in the order: Reverse, Neutral, First, Second, Third? This arrangement would require the driver's remembering only something simple such as: *UP* is fast and *DOWN* is slow (reverse considered slower than a standstill). Personally, I should somewhat regret seeing the speed control lever dropped from the car. Its use gives me the feeling that I am running something. In this respect, perhaps I am a little like the New Orleans Negro who liked to make an imprint on his gal by bossing his mule around, but had to trade off his French mule for one that knew English because he could not concentrate on those French words and his gal all at the same time.

PAUL W. NEFF.

The type of control described by Mr. Neff was used very extensively on automobiles before the present selective control was developed. From the standpoint of control alone the progressive control is undoubtedly superior to the selective control, but a progressively-controlled transmission of the sliding type has to be much longer than one of the selective type, so the distance between supporting bearings is much greater and it is much more difficult to make the transmission quiet in operation. Besides, it would have to be much bulkier and heavier.—Editor.

## Transmissions From a Driver's Viewpoint

Editor, AUTOMOTIVE INDUSTRIES:

I have read the numerous articles in these pages regarding transmissions. As I recall, all the writers were engineers thoroughly familiar with the general subject of transmissions and controls, and undoubtedly are themselves skillful drivers. I do not know much about transmissions beyond what I read in the columns of *Automotive Industries*, nor do I claim to be a very good automobile driver. As a bum driver, however, I have noticed that I have considerable company, and sometimes wonder if my troubles, past and present, may not be quite common among the fraternity of bum drivers instead of being peculiar only to myself. From this point of view, an analysis of some of my driving experiences and their reactions upon me may be of interest to transmission engineers. Since this article deals with personal impressions, the egotistical trend must be pardoned.

Pedal trouble has been my chief bugbear, having been the reason for two accidents—my only ones of consequence. In the first mishap my right foot, in a crucial moment, used the trial and error method for effecting a quick stop, and tried the accelerator first. In the second incident, my right toe caught under the brake pedal in the haste to transfer it from accelerator to brake. These mishaps taught me where to improve my stopping technique, but they were rather expensive driving lessons. Another instance where pedal trouble enters the picture is in start-

ing from traffic stops when ascending hills. Here, I must resort to the hand brake to simplify matters for my feet. All normal people have only two feet. Would it not be possible to provide a car with only two pedals?

As long as pedals start and stop the car, I should regard pedal work the most vital phase of car control. If I were to judge the merit of improvements in other phases of car control, it would be on the basis of the degree to which they distract the driver's attention from the pedals and steering. It is from this viewpoint that I regard the matter of gear shifting or speed changing. While on the new cars, shifting has been so improved that it requires very little effort on the part of the

## Frameless Trucks—Dual-Cylinder Engines

Editor, AUTOMOTIVE INDUSTRIES:

I would suggest that you call J. G.'s attention to your description, published long ago, of the Pak-Age-Car, so he may answer his own question "Frameless Trucks?" which appeared in the issue of June 16th.

Read the article about the Zoller two-stroke-cycle, page 683, issue of June 2nd. In the first paragraph it states that "He . . . is the originator of the dual-cylinder two-stroke engine . . ." This is not correct, for this type of engine was shown at the Armory in Chicago in either 1904 or 1905 in an English car, Lucas by name, and Caunter in his book "Two-

Cycle Engines" gives this firm credit for the first attempt at this construction, correctly in my opinion.

I am not familiar with the date at which Zoller first commenced work on this type of engine but I have myself built engines of this type for more than 16 years and have actually built more than 200 units of varying designs employing the paired cylinder construction.

LEE OLDFIELD,  
Merz Engineering Co.

The statement regarding the two-stroke engine should have read: "He is the originator of the Zoller dual-cylinder two-stroke engine."—Editor.

# Four Models Make Up Finnish Line of Truck Chassis

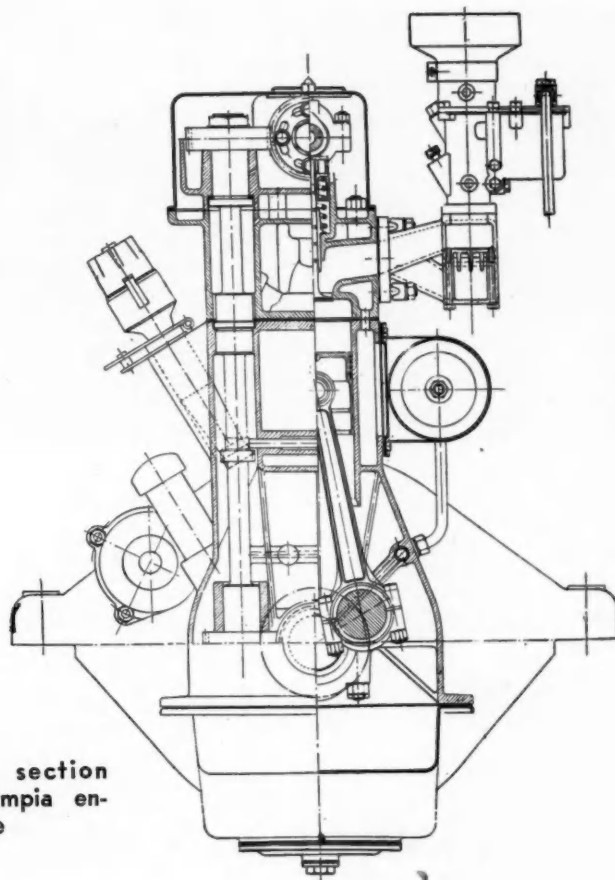
A LINE of chassis for trucks and buses, comprising four models and ranging in capacity from 2½ to 3½ tons, is offered by O/Y Suomen Autoteollisuus A/B (The Finnish Auto-Industries Company) of Helsingfors, Finland.

The company began manufacturing trucks and buses for the Finnish market on a small scale a couple of years ago, operating under a license arrangement and assembling parts furnished by foreign truck manufacturers. However, the intention always was to make the company independent, and at present many of the most important parts are made by Finnish manufacturers. Steering gears, transmissions, brakes, etc., are still being ordered from foreign specialists.

The entire line is equipped with six-cylinder Olympia engines, a product of the Finnish Motor Factory of Wasa, Finland. A choice of four wheelbases is offered, ranging from 134 to 184 in. The track is either 60 or 62½ in. Tires are 6.50-20 in. on the narrow-tread model (duals in the rear) and 7.50-20 in. on the wide-tread model.

The Olympia engine is of the overhead camshaft type and is rather conventional in design. It has a bore of about 3.15 and a stroke of 4¾ in., so the piston displacement is 220 cu. in. It develops 75 hp. at 2800 r.p.m. and is remarkably silent, even at the higher crankshaft speeds, which is due to the fact that the camshaft drive is by helical gears. The compression ratio is 5.8:1.

Pistons are of cast iron and connecting rods of chrome-nickel steel. Four rings are fitted to the pistons. The downdraft carburetor is of Carter manufacture. Fuel feed is by pump. A 12-volt electrical system is used, starter, generator and ignition unit being by Bosch.



Transverse section through Olympia engine

Full-pressure lubrication is employed. The engine has seven main bearings and is rubber-mounted on the chassis.

The clutch is a single-plate Borg & Beck and the transmission a four-speed Fuller. A full-floating rear axle is standard, with the differential housings and the axle casing made of cast steel. The final reduction is through spiral bevel gears, with a ratio of either 6.16:1 or 6.66:1. The front axle is of I-beam section, of the Elliott type.

Springs are semi-elliptic, 38 in. long at the front and 50 or 55 in. at the rear. All models have Ross

cam-and-lever steering gears. Lockheed hydraulic four-wheel brakes, hydraulically-operated, are employed. The hand brake lever applied shoed against a drum mounted on the propeller shaft.

The pressed-steel channel frames are of domestic manufacture and are provided with substantial cross members. The maximum depth of the side rails is 7.3 in., flanges are from 2½ to 2¾ in. wide, and 5.2 mm. (0.2 in.) stock is used.

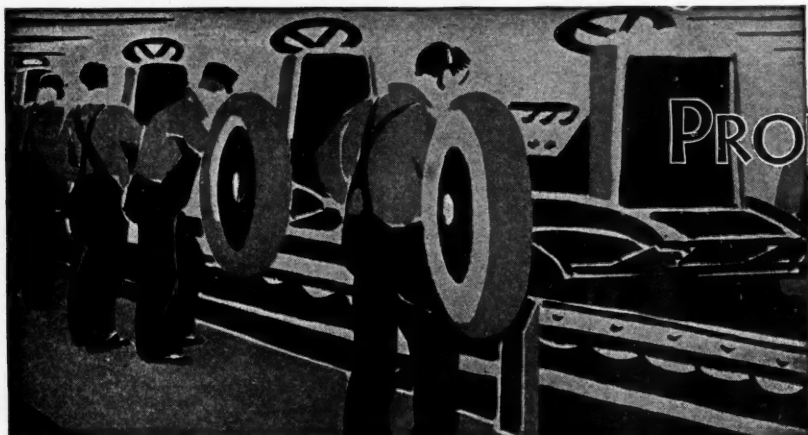
The truck is being marketed under the name SISU and sells at prices varying from \$1,250 to \$2,100.

## Diesel Trucks in 3000-Mile Test Run

The international Diesel road test from Moscow to Tiflis and back, a distance of 3200 miles, was completed on Aug. 24. Nineteen foreign and three Soviet Diesel engines, all mounted on Soviet chassis, were tested. All the engines stood up well over the entire distance, according to the Economic Review of the Soviet Union, maintaining an average speed of 15 to 22 m.p.h. The engines

will now be tested in Moscow laboratories to determine the results of the strain to which they were subjected. The fuel consumption was low, the fuel mileage ranging between 12 and 15 per gallon for 3-ton trucks and between 8 and 10 gallons for 5-ton trucks.

The run started on July 24 and was completed 10 days ahead of schedule.



## PRODUCTION LINES

### Believe It or Not

It is recorded that several days ago a delegation of union workers in a large bus manufacturing plant called on the sales manager. And they propositioned him thusly, "Could they be of help in landing for the company a contract for new equipment for a projected high speed transit line?" Will wonders never cease? Seriously, here is an outstanding example of cooperation between labor and management, reflecting also some measure of the contact between the two groups in this particular plant.

### Motor Standards

1934 edition of the "NEMA Motor and Generator Standards" brings together much information that makes it a reference work of practical value on the manufacture, test, and performance of AC and DC motors and generators. In addition, the standardized mountings for motors have been included. The book is priced at \$2 the copy.

### Chip Disposal

Hear that one of the biggest of the bearing makers has worked out a new system of salvaging and remelting chips and metal scrap. Biggest part of the job is the matter of degreasing the chips, involving the handling of great volumes of metal. When the set up is completed, its details should be of great interest. We'll try to get them for you.

### Needed Work

We submit for your consideration two research projects that are crying for quick action. Both involve worthy standardization matters of wide interest to the automotive in-

dustry. The first is an approach to standardization of practice on valve seat inserts. (See the recent comprehensive survey and tables in *Automotive Industries*.) The second is a study of the utilization of cutting fluids and simplification of practice. How about some independent action to bring about a rapid approach to these problems? We shall be glad to do our bit—in fact these things have been on our pet list for many, many a moon.

### Metallurgical Cut

Growing technique of flame cutting by means of the oxy-acetylene cutting blowpipe is discussed completely in *Oxy-Acetylene Tips* for September. Right now two methods are available—flame cutting which is usually a matter of severing certain sections; and flame machining, a process of accurately cutting contours smoothly and within close limits. Metallurgical cutting is the next step. This is the coming technique of selecting the proper blowpipe, preheating and cutting flame temperatures so as to handle the gamut of alloy steels in commercial use. The article has outstanding merit and should be read by everyone interested in metal working.

### New Data

Ludlum Steel has just supplied us with brand new *Blue Sheet* bulletins descriptive of its stainless steels, machinable grades of stainless, and tool and die steels. In case you are not acquainted with these Blue Sheets, we can tell you that they are engineering bulletins giving complete specifications, physical and chemical properties, machinability, etc. They just lay the cards on the table. If you would like a deck for your own use, let us know about it.

### Treasury Decision

Much surprise and consternation in many places concerning Treasury Decision No. 4422. It specifies a particular form of depreciation accounting which financial executives now say will cost plenty of money to carry out. Quite incidentally, this new policy carries the threat of cutting depreciation deduction by at least 25 per cent and probably as much more as the traffic will bear. It isn't surprising that financial executives should be disturbed by so drastic a move—it is surprising that nothing much has been said publicly before now, considering that the Treasury order was sent out to its agents almost four months ago.

### Production Meet

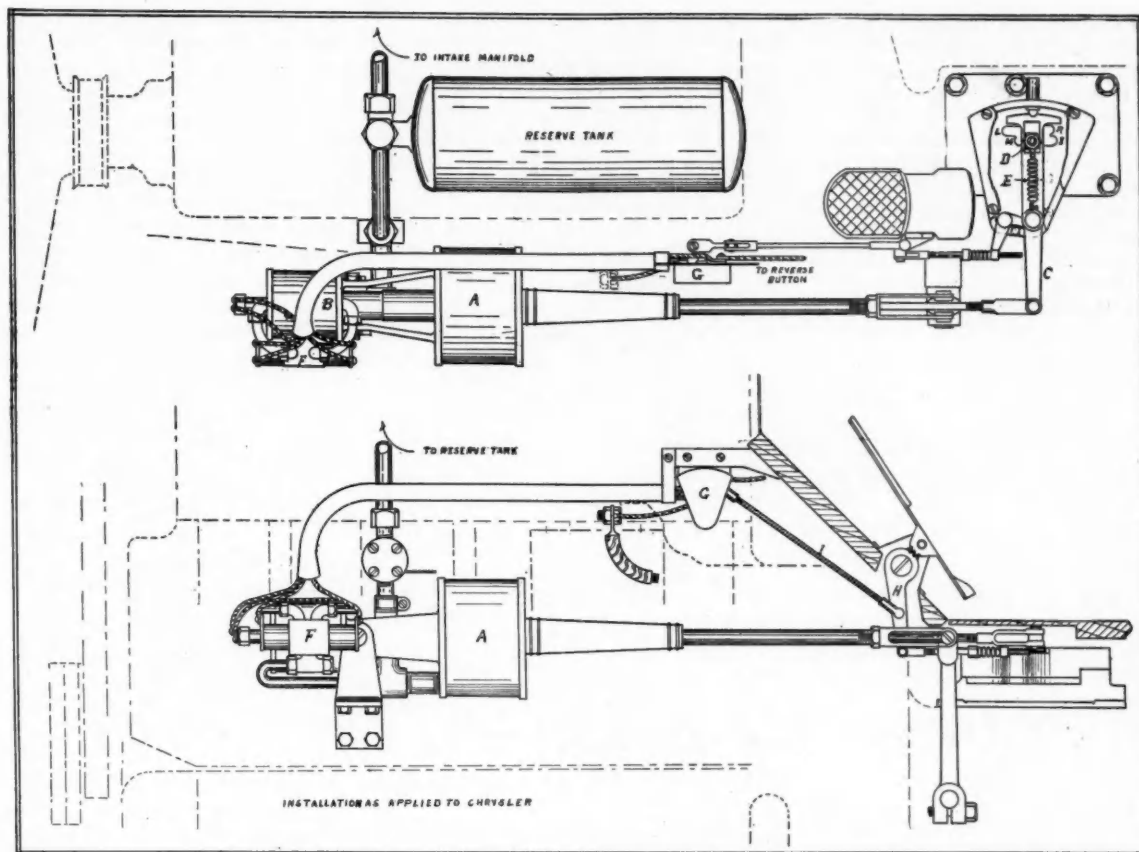
Don't forget to leave open the date of the coming Production Meeting in Detroit. Detroit Section S.A.E. is cooperating with the Production Activity to make it a big success. Let's turn out and make it a red letter event for Chairman McCoy—good old Mac.

### No. 91

The first isolation of proactinium, the rarest metal on earth, worth \$1,000,000 an ounce, was announced to the American Chemical Society this month. The new metal is silvery, radioactive, and its rays are more penetrating than radium. One-tenth of a gram of proactinium, all there is to date, was brought to the meeting from the University of Chicago on a fine thread of tungsten one inch long. It was isolated at Chicago on Labor Day, after years of work by Professor A. V. Brosse. Proactinium is Number 91 in the list of 92 known chemical elements.—J. G.







## Gear Changes Effected by Accelerator in New Vacuum Powered Control System

**A** C. McNARY, of Peoria, Ill., has developed an automatic car-control system of which a diagrammatic illustration is reproduced herewith. It incorporates an automatic shift, an automatic clutch, and a free-wheeling unit, and is designed to be applied to conventional transmissions. Its source of power is the inlet-manifold vacuum, but in order that power may always be available in sufficient amount, a vacuum reserve tank is provided of sufficient capacity for three to four shifts.

Forward speeds are selected automatically on release of the accelerator pedal. Selection of a lower ratio is effected by a backward motion of the accelerator pedal, which is pivoted at one-third of its length from the bottom. The amount of backward travel is 5 deg. for the selection of the intermediate gear and 12 deg. for the selection of low forward and reverse gear. Selection of intermediate gear is instantaneous. When selecting the low gear the foot is rocked backward to about the halfway position. As the shifter finger crosses over from one shifter fork to the other a slight resistance is felt.

Referring to the diagram, which shows two views of the complete installation, the large cylinder A controls the clutch and the small cylinder B all of the speeds of a conventional transmission. The piston rod of cylinder A is hollow and connects through a clevis to the clutch-throwout lever. The piston rod of cylinder B passes through the piston of cylinder A and connects to the outer end of shifter arm C, the opposite end of which carries shifter finger D, which latter corresponds to the end of the conventional gear-shift lever and has a transverse motion to engage either of the shifter forks, but is normally held in engagement with the I-H (intermediate—and high) fork by spring E.

Mounted on the side of cylinder B is a valve F of the D type. Each end of the valve terminates in a solenoid. The valve is operated by switch G, which is connected to the accelerator pedal through arm H and link I. All gears are selected by this valve, which has a travel of 5/16 in. Its power consumption is only 9 watts, which continues only for the short period while the selection is being made. As soon as the

high-speed position is reached the solenoid is disconnected and current consumption ceases.

In its forward position the valve controls I and R; in its rear position, H and L. All speeds are selected when the accelerator pedal is pressed forward, but the shift can take place only after the pedal is released. The clutch-shifting mechanism and accelerator pedal are interlocked, so no shift can take place until the clutch is fully disengaged, and the gears must be fully engaged before the accelerator can be depressed, which makes clashing impossible.

Assuming that the car has been stopped with the transmission in high gear, as soon as the engine is started again the clutch is automatically disengaged and the transmission is ready for any shift the driver may want to make, that into low for instance. As the accelerator pedal is rocked backward, valve F is moved to the forward position by the action of switch G. This applies vacuum to the piston of cylinder B and the shifter arm moves to the center position. Finger D now slides into engagement with the L and R

shifter fork, thus allowing the accelerator pedal to complete its backward motion, which in turn reverses the position of valve F and the direction of travel of the piston in cylinder B, with the result that low gear is selected. The accelerator pedal is now allowed to return to its normal position and during the first acceleration in this gear the intermediate gear is selected by switch G. On release of the pedal, arm C moves finger D with the L and R shifter fork to the neutral position. Spring E takes it across to the I and H shifter fork, and the shifter arm continues on into intermediate. During the next acceleration the position of valve F is reversed and the shifter arm and finger select the high gear upon release of the accelerator pedal, thereby completing the automatic range.

The reverse is selected in the same manner as low gear. By pressing on a button located on the steering wheel while the transmission is in reverse, all automatic mechanism is disconnected and selection of the low gear when in reverse is as described above.

### Flame Front Speed Averages 50 M.P.H.

INVESTIGATIONS conducted at the National Bureau of Standards under the sponsorship of the National Advisory Committee for Aeronautics have shown that in normal explosions in an internal-combustion engine the flame front starts slowly from the spark plug, increases its speed to a maximum near the middle

of its journey, and then slows down as it approaches the combustion chamber wall. The average flame speed for a normal explosion is about 70 ft. per second (nearly 50 miles per hour).

Flame speeds are decreased if the carburetor is set too rich or too lean, or if large amounts of residual gas from the previous explosion are mixed with the new charge, as occurs when the throttle is partly closed. In some manner which is imperfectly understood, an increase in engine speed causes an almost proportional increase in flame speed. This is very fortunate, for otherwise modern high-speed engines would be impractical.

## Automotive Oddities—By Pete Keenan

